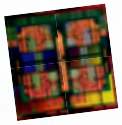

Hands On: AMD's Phenom!
Can it beat Intel's fastest quad-core CPU?

Intel's X48 Unveiled!
Will it become the ultimate DDR3 chipset?

MAXIMUM PC

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Ed Word

The Maximum PC promise to readers

Please send feedback and those chalky Valentine's candies to ***will@maximumpc.com.***

There's been a lot of Internet hubbub about editorial integrity recently. Exactly what "integrity" means is shifting at many publications—print and online—as barriers between editorial and advertising begin to blur. Luckily for me, *Maximum PC* still operates under the same rules we've had since I started working here more than seven years ago. Lest there be any misconceptions about where we stand, it's time to reiterate our no-BS standards:

Our editorial and advertising departments operate independently
We maintain complete separation between the folks who create the editorial content and the people who sell the ads. We're very serious about this, and, in fact, our whole company is structured to protect this separation. I report directly to our editorial director (former *Maximum PC* Editor in Chief Jon Phillips), and he reports directly to the company president. The germane factor here is that I don't report to someone in ad sales, and if anyone on the sales team ever wanted to escalate complaints about our content, he would have to go through Phillips, who would take the issue to the president. Thanks to the integrity of our sales team, our church-state separation has remained pure during my entire tenure at Future US.

***Maximum PC*'s editorial content will be determined solely by the editorial team**
We (the editors) determine the content of every editorial page, basing our decisions on what we think readers would be most interested in. The editorial team owns the content from initial conception to final execution, and we are the only ones who edit or modify it. The editorial staff determines which products will be reviewed, and all products are treated equally, regardless of whether they come from advertisers past or present.

***Maximum PC* will never accept payment for product coverage**
Advertisers can't buy their way onto the cover of the magazine, or anywhere inside it. Accordingly, when choosing hardware for challenges and how-to stories, our decisions are based entirely on product merit and appropriateness.

Our editors won't take any form of compensation from vendors—be it cash, travel, or extravagant gifts
We don't take money from vendors, and we don't accept expensive gifts. We do keep coffee cups and other inexpensive tchotchkes, however, as they make good giveaways. Also, our editors are prohibited from working on advertorial content.

Neither our advertising department nor our advertisers are aware of review verdicts before an issue goes to press
We don't make vendors aware of verdicts until it's too late to change them. Likewise, our ad-sales department doesn't have access to editorial content until after the magazine has shipped to the printer.

***Maximum PC* will continue to deliver fair coverage of all the products and technologies that you love, free of advertiser influence**
Letting you know about great hardware, and warning you off of bad hardware, is why we're here. We'll continue doing it as long as you keep buying our magazine and coming to our website.

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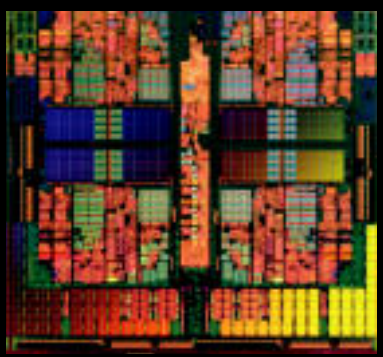

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Will the new CPU push AMD ahead of Intel again?

MAXIMUM PC

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Future plc is a public company quoted on the London Stock Exchange (symbol: FUTR).

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SUBSCRIPTION QUERIES: Please email customerservice@maximumpc.com or call customer service toll-free at 800.274.3421

Maximum PC ISSN: 1522-4279

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Intel Turns the Screws

1,600MHz front-side bus support and a new chipset are sure to put the hurt on AMD

Intel's X48-based enthusiast motherboard will add more voltage and memory-ratio controls to its top chipset.

With the Phenom reception going phenomenally badly (see our feature story on page 42), Intel is adding to AMD's misery by launching its fastest quad-core desktop processor yet—and a fiery new chipset to go with it.

Intel's new Core 2 Extreme QX9770 coughs up just 200 more megahertz than its previous fastest proc, the 3GHz Core 2 Extreme QX9650, but it also ups the front-side bus from the standard 1,333MHz to 1,600MHz. Until the release of QX9770, Intel's Xeon has been the sole supporter of 1,600MHz FSB speeds on Intel chips.

The QX9770 is the second 45nm Penryn-family CPU from Intel, and even though you won't be able to buy it until February or March, Intel has been pimping the CPU to anyone who will listen. Why unveil a chip months before it will be available? There are two prevailing theories: Intel wants to really emphasize the underwhelming performance of AMD's Phenom processor, or the company needs to get as much life out of its 45nm Penryn CPUs as possible before the next-generation Nehalem arrives later this year.

Like Penryn, Nehalem will be based on a 45nm technology, but it will adopt a host of features that have long been in AMD's domain, such as an on-die memory controller and direct chip-to-chip communication.

The QX9770 doesn't arrive alone though. Intel will pair the new processor with its X48 chipset. A replacement for the X38 chipset, the X48 will bring official 1,600MHz FSB support, support for Intel's XMP memory profiles (think Nvidia EPP profiles) for higher speed modules, and higher voltage output to run overclocked memory modules.

The X38 chipset, however, will not be immediately mothballed. Intel will continue to offer X38 chipsets for computers needing ECC RAM support and DDR2. It's not clear if X48 will support only DDR3, but Intel is reportedly leaning that way.

Enthusiasts will likely welcome the arrival of Intel's new 1,600MHz FSB processor, but they're also likely to be confused by the timing of the X48 chipset. Coming just a few months after the debut of the X38 "performance, enthusiast chipset" and offering only minor improvements, it's enough to make you wonder if the X38 should have existed at all. Wouldn't it have been better to come out with one chipset?

Intel says that in a perfect world, yes, but it's just responding to the demands of enthusiasts. According to Intel, enthusiasts want 1,600MHz FSB CPUs, and they want chipsets that support them.

INTEL'S ENTHUSIAST CHIPSETS AT A GLANCE

CHIPSET	975X Express	X38 Express	X48 Express
SOCKET	LGA775	LGA775	LGA775
CODE-NAME	Glenwood	Bearlake X	Bone Trail
RAM SUPPORT	Dual-channel DDR2/667-800	Dual-channel DDR2/667, 1066 DDR3/1333, DDR3/1600 XMP support	Dual-channel DDR3/1333, DDR3/1800+XMP support
FSB SUPPORT	800/1,066	800/1,066/1,333	800/1,066/1,333/1,600
DUAL-GPU SUPPORT	x8/x8	x16/x16	x16/x16
SOUTH BRIDGE	ICH7R	ICH9R	ICH9R
PCI-E SUPPORT	PCI-E 1.0	PCI-E 2.0	PCI-E 2.0
RELEASE DATE	Nov 2005	Nov 2007	Mar 2008

Verizon Opens Its Network

Wireless provider to allow 'any app, any device'

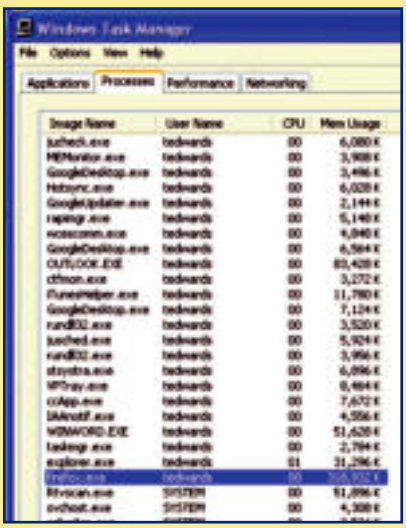
Wireless provider Verizon recently announced it will open its network to third-party devices and applications. The company plans to release technical specs in early 2008 and approve products for use on its CDMA network later in the year. While some news stories stated that Verizon would join Google's Open Handset Alliance and drop its suit against the FCC's open access rules, this is not the case. Jim Gerace, VP of corporate communications for Verizon Wireless, explained that while the company is open to Android working on its network, it has not joined the Open Handset Alliance. Gerace went on to say that the company does not question the philosophy of open access but believes the market, not regulation, should drive the industry.

Firefox Flubs It?

The open-source titan experiences its first major gaffes. Will it recover?

We've long recommended that power users adopt the open-source browser Firefox. Its stability, extensibility, and security make it the browser of choice for discerning web heads. Unfortunately, a botched security update and an as-yet-unfixed memory-leak issue are beginning to make us question our recommendation.

It started with the 2.0.0.10 security patch, which fixed a cross-site scripting error that allowed people to access other people's Gmail address books. Sounds reasonable. Unfortunately, the patch had an error that prevented dynamic rendering of bitmaps. Oops.


Windows Task Manager
File Options View Help
Applications Processes Performance Networking
Image Name User Name CPU Mem Usage

That situation has coincided with the browser's continued memory-management woes. The current version of Firefox can absorb upwards of 400MB of memory, and according to Mozilla's Infrastructuralist Vlad Vukicevic, Firefox 2 users are out of luck. "All effort on memory usage and other improvements is focused on Firefox 3…. The goal is to have Firefox memory usage remain stable throughout a user's surfing session," he explained. Firefox 3 is scheduled to launch in mid-2008.

If you run Firefox for just a few hours, it can absorb as much as 400MB of memory.

TOM **HALFHILL**

Transmeta's Rebirth

In the June 2005 issue, my column stopped just short of being an obituary for Transmeta, the feisty company that challenged Intel in 2000 with a new family of low-power x86-compatible processors. Transmeta was nearly dead in 2005, clobbered by Intel's low-power Pentium M.

Now Transmeta has a second life—and not as an avatar in an online virtual world. This rebirth is for real. In 2006, Transmeta sued Intel in federal court, alleging that Intel had infringed on 11 of Transmeta's patents on microprocessor-related technology. A few months ago, Intel agreed to settle out of court. Intel is paying Transmeta $150 million up front and another $20 million a year for five years, for a total of $250 million.

This sudden infusion of cash rescues Transmeta from its deathbed. Now debt free with a guaranteed revenue stream for five years, Transmeta has a second chance. What will the company do with the windfall?

Naturally, Transmeta is reluctant to discuss future plans. And frankly, I don't think the few remaining executives have completely decided what to do yet. Even by Silicon Valley standards, $250 million is big money that creates many opportunities. But one thing is clear: Transmeta won't repeat past mistakes by again challenging Intel (or AMD) in the x86 microprocessor market. Transmeta's Crusoe and Efficeon processors have reached the end of their lives, despite the company's survival.

Instead, Transmeta is licensing its power-management technology to other companies that make processors. Right now, Transmeta's most valuable technology is LongRun2, which dynamically varies the threshold voltage of transistors to improve their power/performance efficiency. Lowering the threshold voltage allows transistors to switch more quickly, but they leak more current. Raising the threshold voltage reduces leakage but also reduces the switching speed. LongRun2 can vary these parameters hundreds of times per second throughout a chip in response to changing workloads. Transmeta's remaining engineers—about 40 people, including contractors—are working to improve LongRun2 and develop additional technology suitable for licensing.

Transmeta is eager to license LongRun2 and the earlier LongRun technology to any processor company, including Intel and AMD. (Last summer, AMD invested $7.5 million in Transmeta.) So even though Transmeta's innovative power-management technology couldn't save the company's own processors, it may appear in future processors from Transmeta's former competitors.

Tom Halfhill was formerly a senior editor for Byte magazine and is now an analyst for Microprocessor Report.

GAME THEORY

THOMAS MCDONALD

Return of the King

I was seriously hooked on the first generation of Unreal games. From the moment I saw Tim Sweeney's early work on the engine, it was clear he was doing something special. While id Software had fallen into a creative slump at the time, content to work with a drab and unappealing color pallet and claustrophobic level design, Sweeney's new vision of 3D graphics was bursting with color, sweeping vistas, and outdoor environments. The design innovations carried into the gameplay as well, with weapons, levels, and pacing that injected new life into the shooter.

Ten years on, I find comments about Unreal Tournament 3 being the "same old, same old" simply baffling. If, like me, you were irritated to see Gears of War going to the Xbox 360, know that we've been paid back in full: UT3 displays an eye-popping sense of color, light, space, and speed that is utterly impossible outside of the PC.

The continued small-yet-huge tweaks to the online shooter formula are what fascinate me from a design point. I've read of people dismissing the Warfare mode as just a minor variant on control points. Absurd. The addition of power cores, nodes, and orbs radically changes the tactics and pacing of standard control-point play. Stirring in vehicles, rail turrets, hover boards, and link guns to this brew creates the most innovative addition to objective-based online action gaming we've seen in the new generation of games, and that's saying something.

Each small addition and task (breaking down shielding, capturing and defending nodes, running orbs, etc.) gives rise to a complete shift in tactical roles, and does so without ever introducing a character class system. What UT3 and all the other next-gen games show us—and what is so wonderfully surprising this season—is how much growth is still possible while staying true to the FPS formula. They are small changes within an already circumscribed genre, but for fans of that genre they have a huge effect on play.

I used to think that shooter design innovation had reached its limit, and designers would be left simply pushing for better graphics with each new generation. But the 2007-2008 season has shown us something different, and I've never been so happy to be wrong.

Thomas L. McDonald has been covering games for 17 years. He is Editor-at-Large of Games Magazine.

WORD WATCH

Microblogging

Definition: *The practice of posting brief, regular updates about your thoughts, ideas, or activities, which can be viewed by a group of your choosing via text messaging, email, IM, or the web.*

Microblogging, as both a term and a pastime, was popularized by the website Twitter, which facilitates the mini missives. Other such sites, including Jaiku and Pownce, have helped spawn a trend whereby practitioners can be in constant contact with their family, friends, and associates.

Congress to Lower Pirates' Sails

Two new bills carry stiff implications for those who turn a blind eye to copyright law

Dark clouds are on the horizon for the nation's less-than-legal file sharers. Two bills that look to stem the flow of digital piracy by imposing sterner enforcement measures are traveling through Congressional committees.

The first piece of legislation, dubbed the College Opportunity and Affordability Act of 2007, has been recommended for a full vote by the House Education and Labor Committee. It calls for colleges and universities to better inform students about the legal consequences of copyright infringement. Schools are also tasked with developing enforcement measures to combat file sharing or risk losing all federal financial aid contributions.

A second bill, the Prioritizing Resources and Organization for Intellectual Property Act, looks to expand fines in copyright-related cases and decrease the requirements currently needed for imposing maximum criminal penalties for file sharing. The bipartisan bill would also create a new federal agency—the White House Intellectual Property Enforcement Representative, or WHIPER—to track down large-scale copyright infringers.

Score Another Point for DRM-Free Music

Sales at UK-based online music store dramatically favor unencumbered tracks

Not that we need any convincing, but online music sales results from 7digital.com make a mighty persuasive case for keeping DRM off digital music tracks. The UK-based digital music retailer, whose catalogue includes more than 3 million songs from both major and independent record labels, says sales of DRM-free MP3s outnumber those of DRM-encumbered tracks by a ratio of four to one. It makes sense that consumers would be more compelled to buy a file format they can use on any device, but 7digital's sales results reveal a less obvious finding. Customers who buy DRM-free music from the site are more likely to purchase full albums as opposed to buying only single tracks. How much more evidence do the record labels need that DRM is a no-win proposition?

Transformers director Michael Bay thinks Bill Gates is the real villain.

Is MS Plotting against HD Discs?

Michael Bay is accusing Microsoft of backing HD DVD just to keep a format war raging. In a forum post on MichaelBay.com, the director contends that Microsoft ultimately wants both Blu-ray and HD DVD to fail. If consumers are so confused and fed up with the competing formats, they'll embrace digital downloads, such as those offered by MS's Xbox Video Marketplace, says Bay.

TiVo Branches Out

DVR company will enter a host of new markets, including the PC

TiVo has partnered with software developer Nero to bring its DVR features to the PC. Next-generation Nero media software will include the popular TiVo interface and features, but a release date for the product has yet to be announced. The partnership with Nero is just one of many new ventures for the company. Although DirecTV dropped TiVo in favor of its own product, Comcast has begun to offer the service as a $2.95 upgrade above standard DVR service, and an agreement with CableLabs means TiVo will soon be able to offer cable subscribers on-demand programming through its own set-top boxes. Additionally, the company is working with Amazon and Rhapsody to bring movies and music, respectively, to its DVR platform.

Vivendi, Activision Mega-Merger

In December, Vivendi, the French media conglomerate that owns Universal Music Group and Blizzard Entertainment, announced it would merge its games division with U.S. publisher Activision. The $18.9 billion deal would create Activision Blizzard, a new publicly traded company utilizing the strengths of Blizzard's online presence and Activision's successful game franchises (Guitar Hero III alone made $115 million in its first week of release). While Vivendi will own a majority 52 percent stake in the new publisher, Activision's current head, Robert Kotick, will be the CEO of Activision Blizzard.

The deal is scheduled to be finalized in mid 2008, pending approval from shareholders and regulatory commissions. Once established, the new entity's worth would rival that of current gaming monolith Electronic Arts, which has a market value of $17.7 billion after recently purchasing independent developers BioWare and Pandemic. A rep for EA stated that "[the Activision/Vivendi merger] doesn't change our strategy. Our CEO has been encouraging senior managers to think of all other publishers as one large competitor—he's been encouraging them to think like challengers." EA also owns a 25 percent stake in rival publisher Ubisoft.

Most gamers won't be affected by the largest merger in game-publishing history. Blizzard's game-development programs will remain autonomous while the company continues work on StarCraft II and the upcoming World of WarCraft expansion, and existing brands such as Sierra and Vivendi Mobile Entertainment will still exist on store shelves. Activision Blizzard did reveal, though, its commitment to annually "exploit" successful Activision franchises, including Tony Hawk, Call of Duty, and, of course, Guitar Hero.

FUNSIZENEWS

HOT COFFEE SUIT SETTLED

It's been more than two years since Grand Theft Auto: San Andreas created a stir with its "Hot Coffee" mod—a third-party hack that unleashed hidden sexual content in the game—but the issue is just now being settled. In response to the outrage and legal issues that ensued over the racy material and the rating misrepresentation, Take Two, the game's publisher, has agreed to give offended parties a revised version of the game or $35 in cash.

DRM-FREE MUSIC FOR THE MASSES

In a bid to lure consumers to its DRM-free digital music store, Amazon is teaming up with Pepsi to give away 1 billion MP3s. Coupon codes found on the underside of Pepsi bottle caps will be redeemable for music tracks at the online music store—five codes are required for a single song. Expect a huge promotion for the giveaway during this year's Super Bowl.

NATIONWIDE WIMAX NO MORE

Citing "business complexities," Clearwire and Sprint Nextel have abandoned plans to jointly build out a nationwide network to deliver wireless connectivity via WiMax. The news should be especially disappointing to folks in rural areas, as this was seen as a promising means of providing "last mile" broadband service to places that cable and broadband don't reach. Both companies will continue with their own local WiMax deployments.

MPAA IRONY

The Motion Picture Association of America found itself on the other side of the fence recently when it was served a DMCA takedown notice. A Linux-based software toolkit that the organization distributed to universities for the purpose of tracking illegal file-sharing apparently ran afoul of the open-source General Public License. The GPL requires that source code be made available to end users, something the MPAA failed to do.

ONLINE PHOTO SHARING

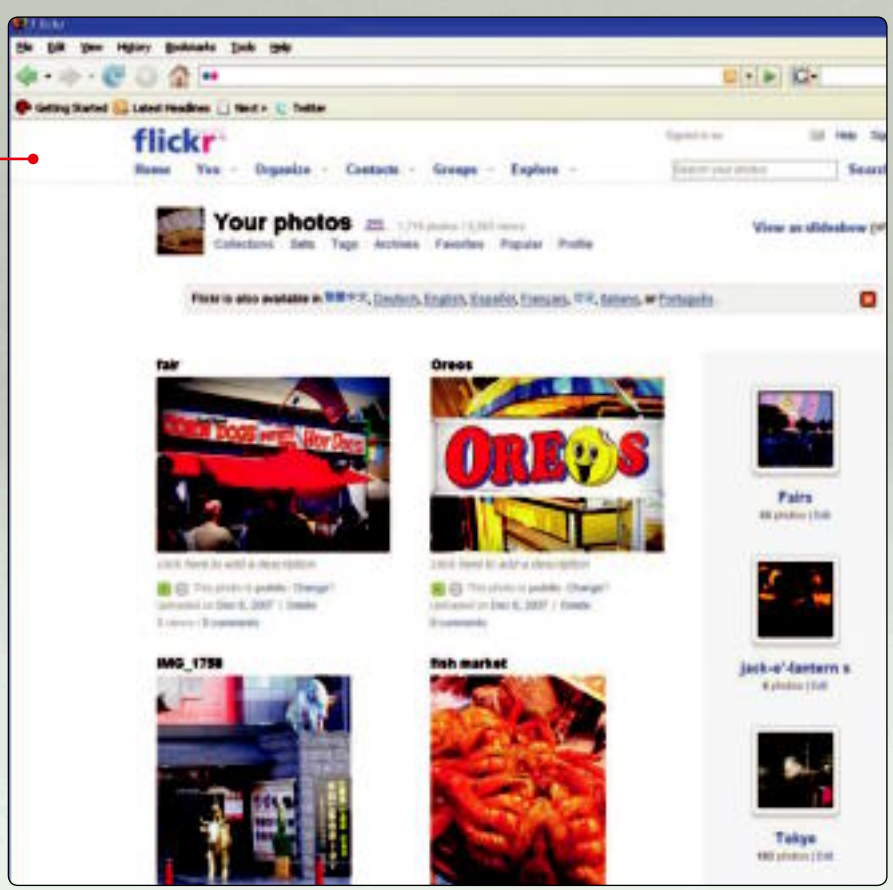
Flickr **vs.** Picasa

Way back in the day—the 1990s!—photography was a cumbersome hobby that required trips to the drugstore for film processing (or the creation of a home photo lab), long waits for prints, and a collection of photos that inevitably ended up stuffed into shoeboxes that themselves ended up stored under the bed. Digital cameras have simplified this process, but for many people those shoeboxes have been replaced with hard drives full of images.

Luckily, myriad photo-sharing sites are online, allowing you to save and share all those pics. Here, we pit two online photo-sharing sites in a battle, longtime-favorite Flickr and Picasa—Google's downloadable photo editor, which now includes online sharing.

BY TOM **EDWARDS**

FLICKR
www.flickr.com



round 1

UPLOADING

Picasa will automatically grab every image on your machine, so even if you forget where you stuck a photo, this app will find it. And the straightforward interface makes uploading new images little more than a two-click process. It's also simple to print, email, or upload images to your blog from the main page of the Picasa app. Uploading photos to Flickr is also easy, with bulk uploading now possible through the site itself rather than a third-party app. Still, Picasa's search function and its variety of export options allow it to handily win this round.

WINNER: PICASA

round 2

SHARING

The photo of that vivid Hawaiian sunset? Share it with the world. The pic that memorializes the keg stand you took two hours later? Perhaps it's best kept from public view. But there's a lot of room in between these extremes. Flickr allows for four levels of privacy, letting you put your photos in the public view for all to see or limit availability to friends, family, or just yourself. Additionally, you can send guest passes to people who don't have Flickr accounts, so they can see your pics without having to sign up for the service. Picasa, however, has only an all-or-nothing option, so you'll have to choose whether you want to keep your family pictures private or make them available for all the world to see.

WINNER: FLICKR

round 3

ORGANIZING

An online home for your photos is no better than a shoebox if it doesn't offer a strong selection of ways to organize your pics. Both Flickr and Picasa allow users to tag and geotag images, as well as create sets. However, with Picasa, that's about the extent of your organization options. Flickr, on the other hand, lets users place sets of photos in larger collections, allowing you to create sets and subsets on a given topic, and the ever-growing Flickr community has a large array of groups focused on just about any theme you could possibly imagine, so you can add your images to public (or private) groups and share images of a similar theme with like-minded individuals.

WINNER: FLICKR

round 4 STORING

Both Picasa and Flickr have free storage options, but power users might want to pony up for extra space. Picasa has a tiered system, beginning with 10GB of storage for $20/year and topping out at 400GB for $500/year. However, you can use the storage space for your Gmail account as well (and any future services Google releases), so if 2.9GB of free email storage and 1GB of photo storage isn't enough for you, this is a good deal.

The free option for Flickr limits you to 100MB of uploads a month, but for $25/year, a Pro account lets you upload and store all the pictures you desire—no limits. Since we don't see the need to keep a database of 300,000 emails, we think Flickr is the best deal for our photo-storage needs.

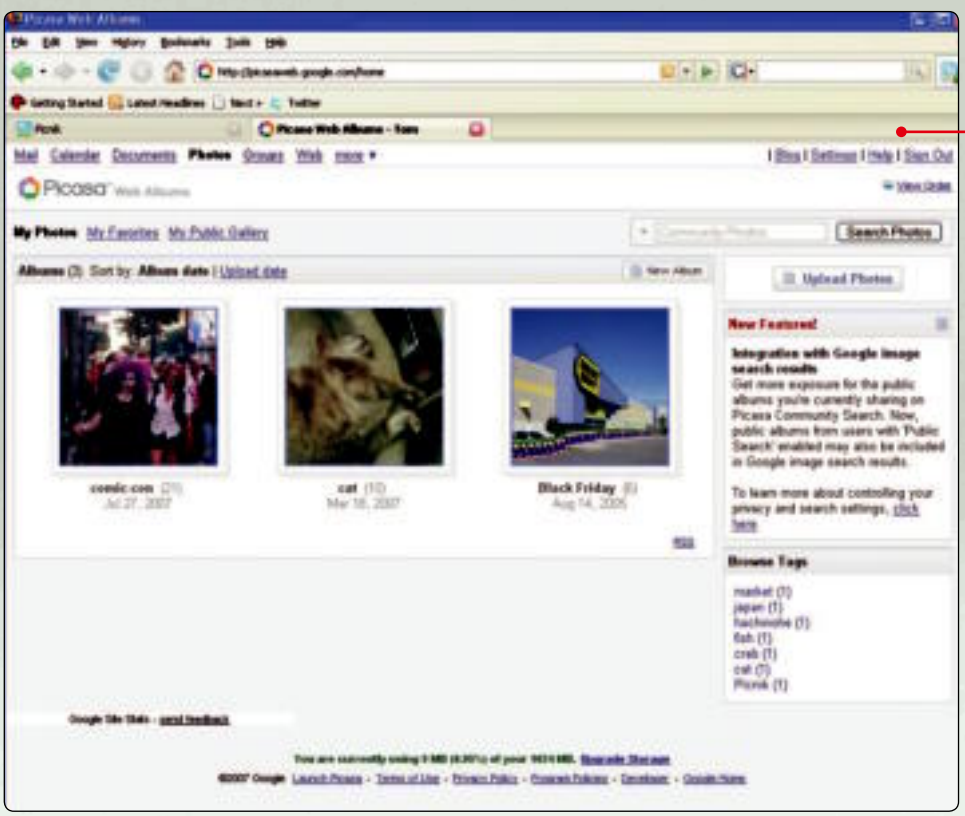
WINNER: FLICKR

round 5 EDITING

Picasa started out as a free photo-editing app and offers a basic suite of tools, including auto contrast and color, highlight and shadow tuning, and 12 effects. However, the tools offer very little user control, making many changes all-or-nothing choices.

Flickr recently added photo-editing options via Picnik; the free version of the app is similar to Picasa, but the $25 Advanced version offers more user control, additional tools, and a selection of 26 effects. For those who don't require all of Photoshop Elements's features but want more user control than free photo editors offer, Picnik Advanced is a good compromise. However, you can access your Picasa web albums through Picnik as well, making Picasa the clear winner here.

WINNER: PICASA



PICASA
http://picasa.google.com

round 6 THIRD-PARTY APPS

Yahoo released Flickr's API back in 2004, so programmers have had a head start on creating third-party apps for the site; large collections are available at **http://bighugelabs.com/flickr/**, where you can go to create a wide range of products, from lolcats to wallpapers, as well as **http://flickrbits.com/**, which includes more than 130 Flickr apps and plugins. Picasa, though, is a bit behind, and many of the apps available for the service also work with Flickr.

WINNER: FLICKR

And the Winner Is...

While Google's worldwide domination of all things online seemingly continues unabated, Flickr is still our choice for online photo sharing and editing. We like Picasa's ease of use and simple uploading interface, and we expect that Google will continue to invest in the product, but at this time it still lags behind Flickr.

We do have some concerns about Flickr's filtering of content on its overseas sites—Yahoo has countered that it's only doing so to comply with local laws. The site has also been inconsistent in how it filters images on its North American site, with seemingly innocuous images of parking lots and other public places deemed unsafe for public viewing. While the situation is not widespread, it does give us pause. Still, Yahoo's photo-sharing site provides the most complete way to sort and search for images. With the addition of the Picnik photo-editing suite, Flickr now provides a comprehensive photo-editing and sharing site with enough options to satisfy typical users. Additionally, Flickr's strong user base is a bonus if you want to share pics with the world, and its multilevel privacy system means you are in control of who sees your pics. MPC

Our consumer advocate investigates...

✓ Beware iPodMechanic.com ✓Art Bell Redirect ✓OKI Data's Shocking Printer

Emma, watchdog of the month

WHERE THE HELL IS MY IPOD?

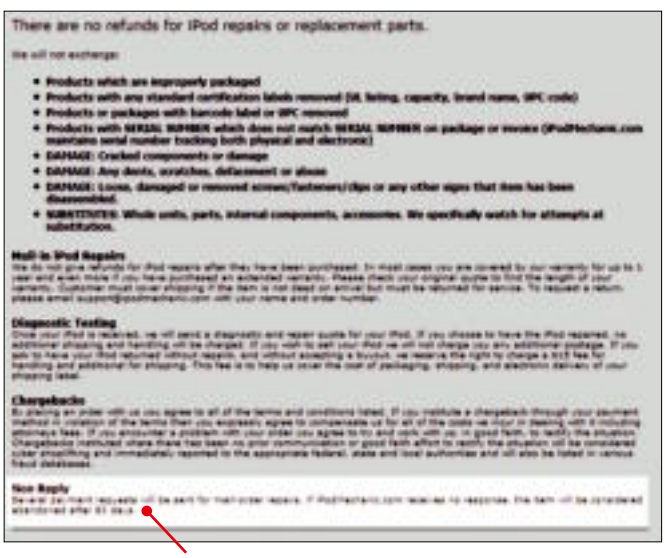
Dog, I have been taken to the cleaners by iPodMechanic.com. The hard drive in my son's iPod went bad. I sent it to iPodMechanic.com because the company has a warranty on repaired drives.

The repair was completed and the device worked fine for a couple of months, but then the iPod quit working again. I contacted the company for a repair under the warranty.

That is when I started getting the runaround, including one of the rudest emails from a customer service rep that I've ever received. I have all of the emails saved to back this up, but to sum up, the company wanted another $100 to fix the iPod because "there were some signs of damage on the iPod, so there is a partial charge for the warranty."

However, when I pointed out that there was already existing external damage to the unit from the first drop that killed the original hard drive, I was told that the logic board had to be repaired, which was outside the original warranty. How it went from drop damage to logic-board damage I don't know. What really ticked me off though was the rude email from a tech named Halli. Near the end of our "discussion" I tried to reach her supervisor but never heard back from anyone. The last email I received stated the iPod had "been recycled." The company did not give me an option of just having it sent back. I highly warn anyone not to use iPodMechanic.com.

—Esther Wheat



Esther Wheat said contrary to iPodMechanic.com's policy, her iPod was "recycled" before 60 days had elapsed.

The Dog contacted iPodMechanic.com for its side of the story. The owner of the company, Nick Woodhams, said an additional fee was going to be charged for the repair of Esther's iPod because the device was beyond its 180-day warranty period. Woodhams said Esther originally sent her iPod to the company on December 8, 2006, and the unit was received for repair again on June 16, 2007.

"This is out of the six-month warranty," Woodhams wrote in an email. "We requested $99 additional (discount from the original repair) to repair the iPod again, which was physically damaged by the customer, not a part defect. The customer declined to pay for the repairs, and we could not come to a resolution. When we stopped communicating with Esther, we assumed the iPod was abandoned and recycled it 60 days after having received it back for warranty [repair]. At this time, we're prepared to make it right with Esther. We will be willing to accept $99 (the quoted price for the second repair) and return a refurbished 30GB video iPod."

The Dog spoke with Esther to ask her opinion of iPodMechanic's solution. Her response: Go pound sand. Esther said that there is no way she is going to get suckered into sending iPodMechanic.com more money. She said it was not 60 days, but just over 30 days before her iPod had been "recycled." And, Esther said, she's still waiting for iPodMechanic to respond to her last email. Instead of contacting her, the company simply recycled her iPod, and she was told there was nothing she could do about it.

Esther would like her original iPod back, but at this point it's gone. She would take an equivalent iPod in exchange, but she doesn't have much hope this will occur. Her frustration is that she could never get a straight answer out of the company.

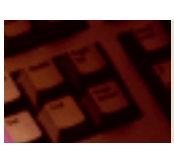
The Dog agrees with Esther. In fact, iPodMechanic could not even give the Dog a straight answer. If you count the days between Dec. 8, 2006 and June 16, 2007, it's only 159 days—well within the 180-day warranty that iPodMechanic claims to offer.

When the Dog went back to Woodhams, he said, "I guess there is a discrepancy with the dates. It was my understanding that it was out of warranty." The Dog also pointed out to Woodhams that Esther's iPod had been scavenged for parts after 30 days, while she was still waiting for a response from the company.

Woodhams said, "That was an error on our part. It should not have been recycled after a few weeks." He said iPodMechanic's official policy is to give the customer 60 days before breaking an iPod down for parts.

When the Dog questioned the legality of such a policy, he said it's the industry standard and pointed to his competitors—including Apple—which consider products abandoned after 60 days. Apple, however, will only sell or dispose of the iPod if you haven't provided a return address for the product.

Rapidrepair.com, which also repairs iPods, gives customers 30 days to respond. However, after the 30 days, the company will return the product if you selected its prepaid shipping option. If repairs have already been made to the unit (and no payment made), the company will try to contact the customer three times and then dispose of the product 90 days after the last attempt at contact is made. So what's iPodMechanic.com's policy?



Got a bone to pick with a vendor? Been spiked by a fly-by-night operation? Sic the Dog on them by writing **watchdog@maximumpc.com.** The Dog promises to answer as many letters as possible, but only has four paws to work with.

Woodhams told the Dog that "automatically generated email is sent at 45 days notifying the customer they're nearing the abandonment period. A phone call is made at 60 to 120 days before recycling the iPod. Another email is sent if we cannot leave a message. Seven days later, if there's no response, the iPod is recycled. In Esther's case, the iPod should never have been recycled."

Yes, and the Dog must note, that's because Esther was never called or emailed about her iPod being "recycled," so one has to wonder what's going on. After further discussion about the warranty discrepancy and the premature "recycling," Woodhams offered to send Esther an equivalent refurbished iPod without charging her $99.

That's good news to Esther, who told the Dog, "Am I happy? Yes, if I have a repaired iPod, but it was a very ugly thing to go through. I don't think anybody who does business with somebody should go through that. Would I ever recommend the company? No."

Apparently, a lot of people agree. The Western Michigan branch of the Better Business Bureau said of iPodMechanic: "The BBB advises extreme caution when dealing with this company." The BBB's report goes on to state: "In June 2006, the BBB of Western Michigan contacted Nick Woodhams, owner of iPodMechanic, in regards to the large number of complaints received. The BBB was assured by Mr. Woodhams that he would respond to all complaints. Unfortunately, the company failed to honor their statement to the BBB."

The company has few fans on the Internet, where just about everybody had gripes. At Amazon.com, where iPodMechanic.com is no longer a merchant, consumers are ***still*** complaining about the company, with at least one consumer saying that his iPod was "recycled" rather quickly.

When asked about the "extreme caution" warning from the BBB, Woodhams said it's "exaggerated." Woodhams also said that the overwhelmingly negative reviews on the Internet go back to temporary staffing issues the company had last year, and happy customers tend not to take the time to post on the Internet, just disgruntled ones. He said the company sees from 10,000 to 15,000 iPods a year, and a small portion of customers can never be satisfied. Woodhams said the situation has improved since last year and explained, "We do still get complaints here and there; we can't please everyone."

"I do apologize for the negative experiences that customers have had. Any customer that has had a bad experience can email or call us and we'll work through a solution to make them happy."

The Dog would also like to hear from you as well—especially if a company claims that you abandoned your hardware. Woof.

AREA 52? IT'S RIGHT NEXT TO AREA 51

After reading your December column about remarked CPUs, I followed the tinyurl you supplied, ***www.tinyurl.com/o0n****, in order to verify the authenticity of my AMD CPU. Amazingly, I was sent to www.artbell.com after pressing Enter. Have I been UFO'ed?*

—Gene Burch

There's no conspiracy here, Gene, just a font that's difficult to read. The correct URL is www.tinyurl.com/o0n, as in the letter O, zero, N—not lower-case O, capital O, N. MPC

Recall **Alert**

OKI Data is recalling a very small number of color printers that may pose a shock hazard. The company said about 175 of its C9600 color printers may shock its customers. The bad printers feature serial numbers that begin with the prefix AA5600 or AA5800. All other printers are unaffected; however, if you have a printer with one of these prefixes, you should check the full serial number. If the printer has a serial number that falls within the ranges of AA56002655A0 through AA56002804A0, AA58001468A0 through AA8001617A0, or AA58002702A0 through AA58002801A0, you should immediately stop using the device and unplug it from the wall.

Contact OKI Data at 877-654-6364 to arrange for an on-site inspection of the printer. More information is available at http://tinyurl.com/2fexwe.

OKI Data will send someone to your home to see if your printer is one of the few units that may shock you.

Internet Security 2.0

With PC threats continually evolving & multiplying, is it time to upgrade our traditional anti-malware suites?

—BY PAUL LILLY

Whether you know it or not, you're constantly under attack by nefarious netizens. Why? Because your computer contains a gold mine of goodies just waiting to be exploited by wrongdoers.

Everything from your banking information and credit card numbers to your processor cycles and Internet connection are valuable commodities sought after by online thieves. We're talking about denial of service (DoS) attacks, threats to your finances, and all-out identity theft. And if that weren't enough, the culprits are continually developing new and increasingly complex techniques to take over your system for their personal gain, spurring an arms race between the digital crooks and the PC security vendors cashing in on the mayhem. But just how much protection do you really need?

In response to these ever-increasing threats, a host of new security applications have started to emerge, and each one promises to offer a level of protection beyond that of your traditional anti-malware arsenal. The developers of these programs claim it's no longer enough to rely on databases of known threats to catch viruses and spyware, and that today's strains of PC pestilence are able to outsmart traditional safety measures. But is this truly the case, or is this simply another attempt to sell more crapware?

To find out, we gathered a host of next-generation security apps, installed them on our systems, and then put their claims to the test. We'll tell you whether these new apps deliver on their promises and whether you should be rushing to upgrade.

ILLUSTRATION BY ADAM BENTON

Trustware BufferZone Pro

A one-click salve for Internet-induced infections

We've had our share of "uh-oh" moments, when curiosity superseded our better judgment and we impulsively clicked a suspicious link or downloaded a suspect file. In most cases, those moments have been followed by a laborious malware disinfection, or if the damage was severe, a full-blown Windows reinstall. Trustware Security promises to make those situations a thing of the past. To prove it's serious, the company will pay you $500 if BufferZone fails to keep your PC secure, with a few caveats (**http://tinyurl.com/2nvc23**). Normally, we'd worry that such lofty claims would result in a Chapter 11 filing, but despite our best efforts, we were unable to wreak irreversible havoc on our test systems and claim our bounty.

BufferZone works its wizardry by isolating all web-based activities, including email and IM software, at the application level. Without BufferZone, application write requests can alter critical system files and make changes to the all-important registry, allowing malware to muck up a system. But with BufferZone installed, applications stay sheathed in a virtualized shell, and write requests are diverted to a virtual folder. Programs think they're writing to the OS, but everything stays intact, even when executing a dirty file. And unlike traditional anti-spyware and anti-virus applications, BufferZone doesn't rely on definition updates; it blockades your system equally well against both known and unknown threats. Rounding out BufferZone's list of tricks is the ability to protect your system from harmful files residing on removable media, such as USB keys and optical discs.

Tired of relatives asking you for free tech support? Install BufferZone on their PCs and schedule it to periodically and automatically undo Internet-based changes. Finally, you can stop screening your phone calls!

By configuring removable media and network paths to open in a virtualized shell, you'll keep your PC protected from every angle.

What BufferZone won't do is install on Windows Vista; compatibility is limited to XP with SP2. It's true that Vista has yet to gain traction among consumers, but we'd expect an app that touts next-gen capabilities to support the latest OS. Trustware assures us this support is forthcoming.

After installing BufferZone, we trotted indiscriminately through the web's darker recesses, visiting every unsavory website we could find. Along the way, we installed toolbars, agreed to suspicious ActiveX requests, and downloaded infected files that would normally spell disaster. But no matter how badly we tried to muddle our system, damage stayed contained within BufferZone's virtual folder. Emptying the buffer was like waking up from a bad dream—all our nasty downloads disappeared, along with any changes they made to our browser. That means legitimate changes, such as toolbars and add-ons, disappeared too, as it's an all or nothing proposition with BufferZone; once you click, there's no going back—and no last minute warnings, either. To save downloads you trust, you can right-click and move them out of the buffer prior to emptying it.

We didn't notice a performance hit when using BufferZone, save for a short delay the first time we opened a program and BufferZone ran an optimization routine on it. And if true to its word, Trustware will have full Vista support by the time you read this.

APPROVED **$30/YEAR**

www.trustware.com/index.html

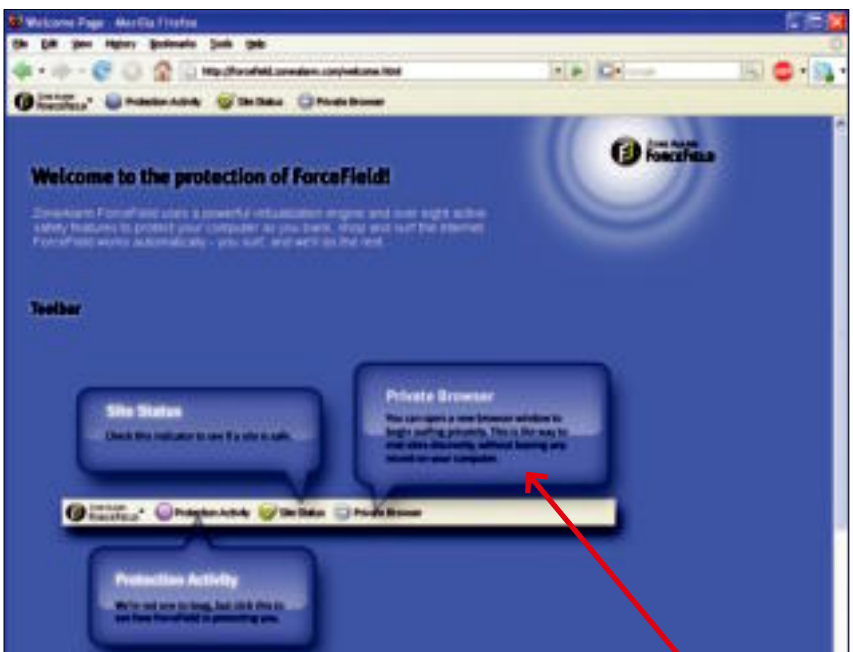
ZoneAlarm ForceField

Protects you from threats on the web, but not from yourself

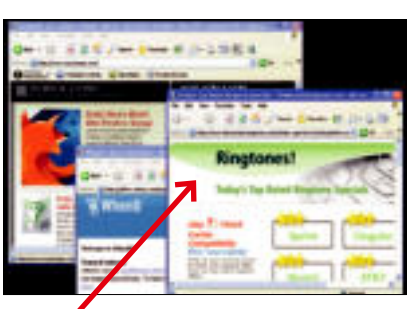
Just surfing the Internet can be enough to infect your system and grant malware uninvited access to your hard drive. But what about the malware that *is* invited? Malware writers know that the quickest way to infiltrate a system is through the end user, and there's no shortage of dirty code masquerading under the guise of helpful applications. By the time you realize you've been duped, it's too late, and it's here that ForceField ultimately falls short.

Like BufferZone, ForceField protects at the application level, enveloping your web browser in an emulation layer. You'll know ForceField's working by the green border glowing around your browser. As you surf the web, unsolicited downloads write to a virtual file system, which prevents rogue sites from thrashing the OS. As a second layer of protection, ForceField issues a warning whenever you're about to enter a site known to distribute spyware, at which point you can enter anyway or hightail it to safer corners of the web.

But unlike BufferZone, this one-two punch falls far short of providing an impenetrable defense. ForceField focuses only on web browsing, leaving email, IM clients, and other connected applications exposed to the same dangers. And while ForceField neutralizes unsolicited downloads occurring behind the scenes, it won't save your system if you accidentally execute a malicious file or willingly install a seemingly innocent application only to find out later it was laced with spyware.



Select the Private Browser to cover your tracks and ForceField will block cookies, prevent pages from being added to the history, and erase auto-fill and completion entries.



A major security flaw allows pop-ups to open outside of ForceField's virtualization shell, giving malware an open door to your system.

ForceField was still in beta form during our tests, and we uncovered a few rough edges. Despite support for both Internet Explorer and Firefox, we initially couldn't get either browser to load through Vista's start menu; instead, we had to right-click the ForceField icon in the taskbar. Several reboots later the problem disappeared. XP wasn't affected, but some applications managed to load unprotected browser windows in both OSes, exposing a major vulnerability.

When we navigated the same shady websites we surfed with BufferZone, ForceField identified only some of them as potentially harmful, letting several others slip through undetected. You have to wait while downloaded files undergo a scan for known malware, and we had little success getting ForceField to flag files embedded with Trojans and other common cruft. False positives were much less of an issue, but that's little consolation given the weak detection of real threats.

By limiting virtualization to just automatic downloads made through the browser, ZoneAlarm also limits the product's appeal. In its current form, ForceField can't be counted on to provide a reliable defense. And even though ForceField isn't intended as a stand-alone security application, there's not enough to it to justify a $30 investment.

NOT APPROVED **$30** $20 EACH ADDITIONAL YEAR

http://zonealarm.com

Norton AntiBot

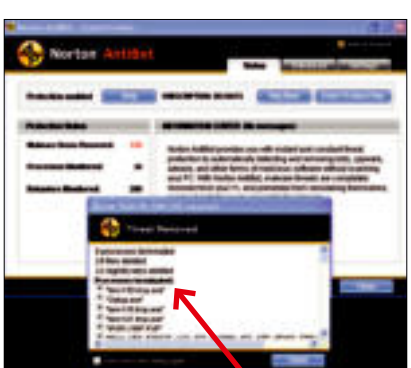
Is heuristic scanning the future of home PC security?

Norton takes a different approach to next-gen security than both BufferZone and ForceField. Rather than employ able to load. It does this through heuristic scanning: analyzing the behavior of every running process and program, looking for characteristics most commonly associated with malware. Like the developers, Norton doesn't bill AntiBot as a stand-alone security application but instead recommends running it alongside your existing anti-malware suite. Nevertheless, we threw AntiBot into the infested online jungle to see if it—and our system—could emerge unscathed.

AntiBot's quick installation will appeal to folks who prefer a no-fuss setup, but power users are sure to lament the lack of customizable options. You can choose whether to automatically quarantine detected threats and whether you want the option of saving your work before doing so, but AntiBot affords little else to the end user.

Norton AntiBot - Control Center
Norton AntiBot
Settings
Notification Settings
Automatically quarantine detected threats
Prompt to save your work before removing threats
Show progress of removing detected botnet and malware
Show botnet and malware removal details
Automatically submit to Symantec Security Response

We dig programs that are easy to configure, but AntiBot gives you very little control over how it operates, making it impossible to fine-tune its behavior to complement your surfing habits.



After disinfecting a dirty file, click the Details link and AntiBot displays exactly which processes were terminated, what files it deleted, and which registry keys it removed.

For all its simplicity, AntiBot was no slouch on the seedier side of the web, going about its work while running quietly in the background and without hampering performance. We agreed to install ActiveX controls when prompted, downloaded files we knew contained payloads, pretended we knew nothing of the dangers lurking on P2P networks, and attempted to install every spyware-plagued game and screensaver we could find. Additionally, we turned off our firewall and failed to update our XP install, which left it armed only with SP2. But despite reckless computing habits that would make even our Dell-owning relatives shudder, AntiBot stopped the majority of threats from taking down our system. Before dirty code could muck our OS, AntiBot froze the operation and alerted us to impending doom. In the case of an unknown danger, a window appeared showing us what suspicious behavior prompted the alert, such as trying to register executables to run on reboot or attempting to write to the Windows directory.

Yet for all that it caught, AntiBot wasn't invincible. It failed to prevent malware from hijacking Internet Explorer: Malicious agents managed to change our homepage, and several tabs went missing in the Internet Options menu. Even our hosts file took a hit, highlighting the weaknesses of heuristic scanning. But AntiBot's biggest failing is that other security products already employ real-time protection, so why pay more for an add-on that really just does more of the same? And if you already own one of Symantec's existing security packages, such as Norton AntiVirus 2008 or the all-in-one Norton 360 bundle, we can't imagine you'd be thrilled at the prospect of spending more money on protection that should have been included in those packages.

NOT APPROVED **$30**

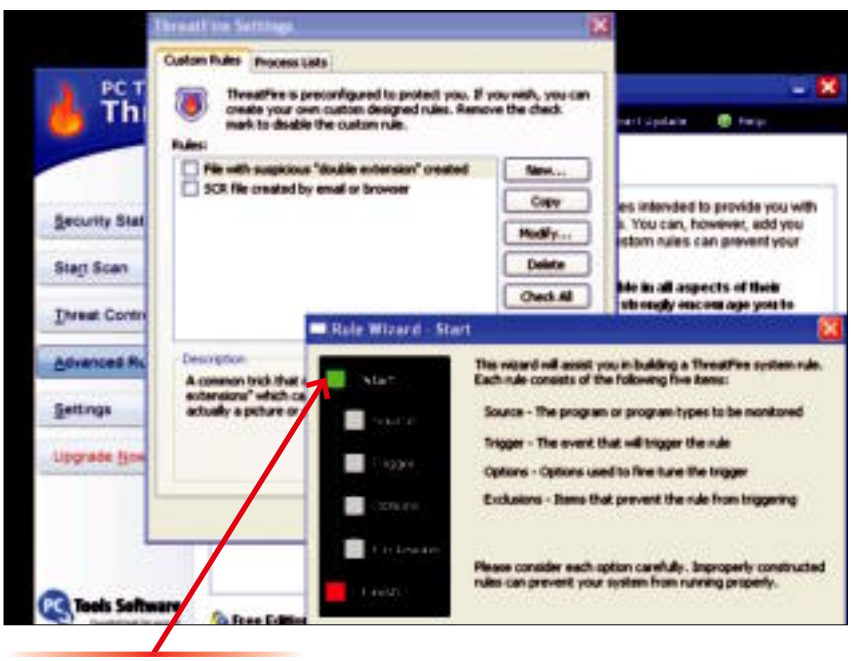
http://tinyurl.com/2nc785

PC Tools ThreatFire

Better than the competition—and free!

"Anything you can do I can do better." We suspect PC Tools has a motivational poster bearing this catchphrase in its board room, because it appears to be the philosophy behind its ThreatFire security app. Just like AntiBot, ThreatFire uses a heuristic scanning engine to unearth malicious malware before it has a chance to grapple with the OS. But the similarities end there, which is a good thing.

ThreatFire picks up the installation routine where AntiBot leaves off, and rather than throw a few arbitrary options at the end user, the app gives you customizable control over additional subsets of the application. If you'd rather not tinker, the default options will keep the set-it-and-forget-it folks protected, but power users will want to poke around the menus and tailor ThreatFire in ways AntiBot doesn't allow, such as enabling automatic restore points before quarantining files. You can also schedule rootkit scanning at set intervals, just as you would with your anti-virus software. But we're most enamored with the Advanced Rule menu, where you can set up custom security rules for virtually any kind of threat. If you want to create a rule that disallows any process from deleting or overwriting files in the Windows/System32 folder, you can do that and then configure exceptions for programs or processes that might legitimately need those types of privileges. Give your custom rule a name and description, and you can enable or disable it thereafter with a click of the mouse. And to add icing to an already tasty cake, ThreatFire's wizard walks you through the process in plain English, so you never feel overwhelmed or unsure about what you're doing. Bravo!



Custom rules make it possible to thwart brand-new worms even before signature updates are made available, and the setup wizard will hold your hand from start to finish.

Color codes indicate the type and severity of attack. In this case, the yellow box warns that the screensaver we just downloaded might be up to no good.

Like AntiBot, ThreatFire runs quietly in the background, making its presence known only when it detects a threat. Pop-up windows are color-coded based on their severity, with red indicating an automatic eradication based on known malware and yellow signifying suspicious activity flagged by the heuristic engine. If you're unsure of what to do, a hyperlink brings up a Google search of the offending file. Gray windows round out the color scheme and represent a potentially unwanted application (PUA). These processes share similar traits to spyware but may be required to run depending on the program they come bundled with. These too carry Google links, but this is one area in which we prefer AntiBot's more detailed rundown, which tells us exactly what the file is trying to do.

Romping recklessly through the net, just as we did before, ThreatFire caught more threats than AntiBot did, preventing the same malware from altering our hosts file or killing IE's Internet Options tabs. And did we mention ThreatFire's free? Combined with the advanced options, it's a clear winner.

APPROVED **FREE**

www.threatfire.com

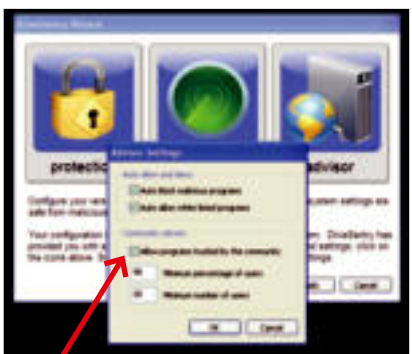
DriveSentry

A firewall for your hard drive

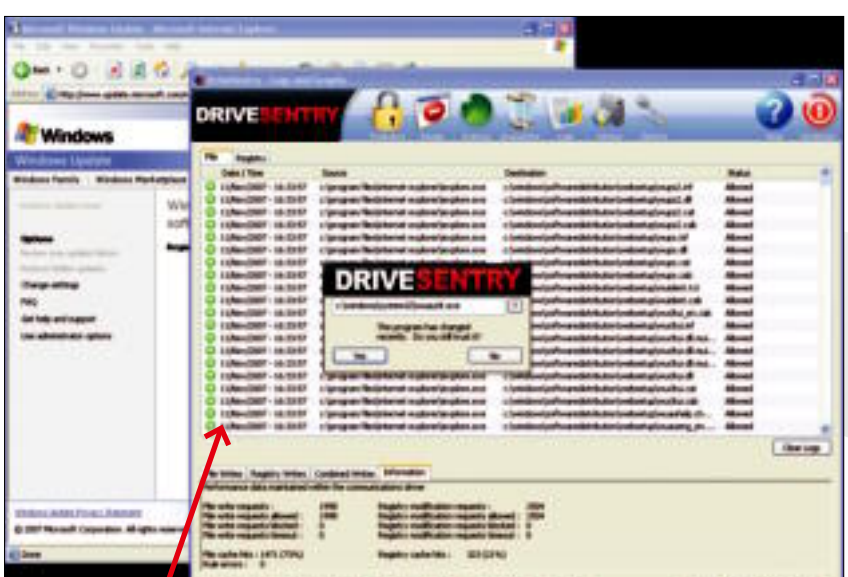
There's no quicker way to infect your system than to tread online without the aid of a firewall. Unscrupulous saboteurs the world over are constantly on the hunt for unprotected PCs, and when they find them, it's open season for unleashing keyloggers, dialers, Trojans, and other toxic trash the riff-raff carry in their arsenals. But with a firewall, you always know exactly what's trying to access your PC, leaving you in command of who comes and goes.

Apply that same philosophy to your hard drive and you have DriveSentry. Borrowing a page from Microsoft Vista and its now infamous UAC, DriveSentry intercepts write requests to your hard drive, giving you an opportunity to deny or allow the action. To prevent being inundated with permission requests from harmless applications, DriveSentry implements an auto-advisor feature. Every time a new program runs, the advisor dials home and looks for a match against a whitelist of trusted applications, as well as a blacklist of known threats. Like your old high school cliques, programs are labeled according to how DriveSentry and the majority opinion among the community of users view them. A good program could potentially be deemed dangerous, or vice versa, though we didn't run into any issues with mistagged programs during our tests. We did, however, run into an annoying number of pop-up alerts, even for trusted applications. Opening Notepad, for example, prompted a pop-up letting us know the advisor was dialing home, followed by a second alert telling us the program has been cleared to run. We dig the diligence but not the constant cries for attention.

DriveSentry's greatest strength lies in its level of customization. The dizzying array of options is enough to overwhelm even staunch RTS fans raised on micromanagement, but for those willing to put in the time, you're afforded a meticulous level of control over what files every program can or cannot write to. You can also create custom rules blocking a program's access to entire folders or drives. Removable media, such as your USB key and optical discs, are protected too. And for armchair auditors, the Logs tab keeps track of every attempted write ever made and whether or not it was allowed.



Putting your trust in DriveSentry's community of users will cut down the number of false-positive alerts, but we're not so keen on letting others dictate our security.



Keep track of every file and registry change made to your hard drive by looking in DriveSentry's logs. Even Windows Update can't make changes without being noticed.

We tried our best to thwart DriveSentry, but viruses and spyware never stood a chance, as long as we intervened. Should less-savvy users ignore the warnings, or worse, should a band of hackers infiltrate DriveSentry's servers, the advisor could conceivably feed bad advice.

Even with the potential risks, DriveSentry offers a level of protection rivaled by only BufferZone. Combined with an anti-malware suite, this is as close as it comes to creating an impenetrable defense; just prepare yourself for a steady, and annoying, stream of alerts.

APPROVED **$10**

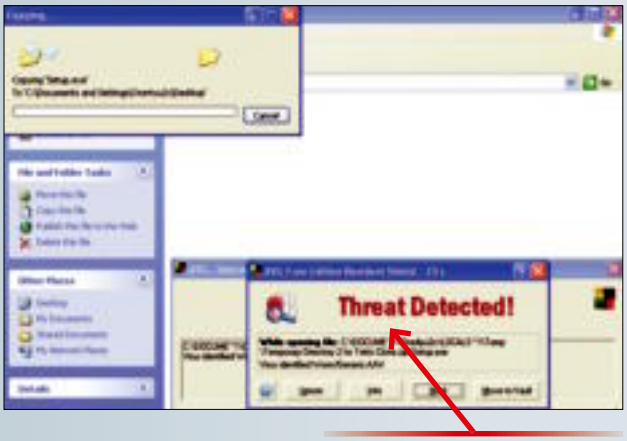
www.drivesentry.com

OUT WITH THE OLD, IN WITH THE NEW?

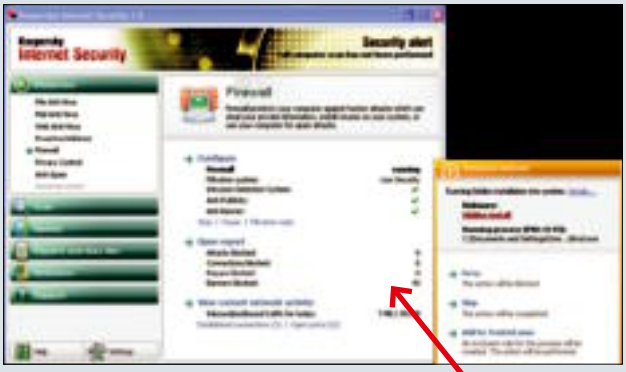
We've seen what the best in generation 2.0 security software has to offer, but how do these new-school apps stack up against a pair of traditional favorites?

Today's malware continues to evolve at an alarming rate, and only a handful of next-generation security applications have passed muster in our stringent Lab tests. But none of these applications is intended as a stand-alone security suite, making us wonder if we really need an additional layer of protection if we're already surfing on a solid foundation. To find out, we challenged a couple of traditional favorites to see if new threats really call for new ways of fighting them.

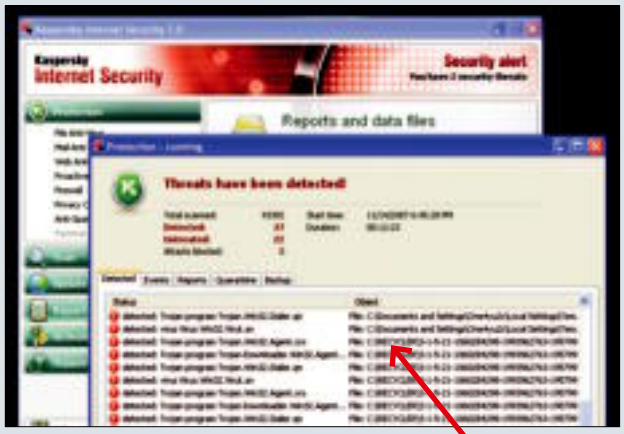
Representing the bang-for-buck camp, we chose AVG (free, http://free.grisoft.com) for its excellent scanning ability and even sweeter price tag. It's not that we're unwilling to pay for anti-virus software, but when we last examined AVG, it earned a 9 verdict (March 2004), besting the two not-free programs it was pitted against. Fast forward to today and not much has changed. AVG kept our test system clean during our haphazard jaunts around the web, and the real-time protection stopped us from opening innocent-looking files with malicious code nestled inside, including email attachments. But far from being a do-everything solution, AVG left us vulnerable to spyware, and its free edition doesn't come with a firewall. Windows Defender did a good job of picking up the slack, but some spyware still slipped by, and Windows XP's built-in firewall shields only against inbound threats, not outbound.



Whoever said you have to pay for adequate protection never gave AVG a whirl. In this case, AVG detected a virus before we could even start the download.



To keep new strains of malware from sneaking onto your system, Kaspersky actively seeks out suspicious behavior and immediately notifies you of it.



If you routinely find your system infected by this many viruses, it's time to look toward improving your computing habits rather than adding layers of protection.

Next, we turned our attention to Kaspersky's Internet Security 7.0 ($80, www.kaspersky.com), a full-fledged security suite combining anti-virus scanning, spyware protection, and a firewall all rolled into one. Kaspersky also boasts hourly anti-malware updates, closing the window of opportunity for new threats to sneak by unobserved. And should that happen, the real-time monitoring and heuristic engine provides a formidable wall as a last resort. The laundry list of features, such as on-the-fly Internet traffic scanning, goes on and the vigilance paid dividends every time we tried to install a program with hidden malware. Kaspersky even detected bundled adware before it had a chance to finish installing.

But in the end, your computing habits ultimately play the biggest role in defending against malware. By avoiding high-risk scenarios, such as visiting illegal download sites, and staying behind a firewall, you greatly reduce your chances of getting an infection. And you needn't ever pay for protection against online threats. We like how BufferZone kept us shielded behind a virtualized shell and DriveSentry left little room for malicious agents to slip through, but these paid programs are overkill even for power users, making ThreatFire the sole standout. Combine ThreatFire with AVG and Defender, and you'll have a free bundle that keeps you one step ahead of the bad guys. MPC

VIDEOCARD IMAGE-QUALITY SHOOTOUT

Which company delivers the best visual experience: **AMD or Nvidia?**

We rely mostly on objective benchmarks here at *Maximum PC*, especially when it comes to evaluating videocards. It's just easier to defend a verdict that's based on frames per second because—assuming you're using a good benchmark and the same parameters—you'll get pretty much the exact same number with every run.

Of course, frame rate isn't everything, especially if your PC's primary mission is something other than gaming. If you use your computer for editing video, watching movies, or manipulating digital photographs, you're much more interested in visual quality. Judging image quality, however, is much more difficult because it's necessarily a subjective task.

But we've been hearing whispers from sources (who wish to remain anonymous, although we can tell you they represent neither AMD nor Nvidia) that ATI GPUs deliver better image quality than what Nvidia has to offer. ATI product managers made a similar claim while rolling out their AVIVO technology initiative, but neither AMD nor Nvidia have had much to say on the topic for quite some time.

Never ones to let sleeping dogs lie, we decided it was time to settle this issue *Maximum PC* style: We gathered a bunch of our game-playing, movie-watching, photo-editing colleagues and challenged them to a blind taste test. Would the consensus opinion favor AMD or Nvidia, or would anyone be able to discern any differences at all?

BY MICHAEL BROWN

HOW WE TESTED

A lot of thought went into developing our test methodology. Here are the details regarding the hardware and software we used, along with our rationale for making these choices

THE HARDWARE

The fact that we awarded HP's VoodooPC-designed Blackbird 002 a 7 verdict in our Holiday 2007 issue didn't dissuade us from using the innovative rig for this challenge. Although we panned the particular eval unit we received because it included Radeon HD 2900 XT cards in CrossFire, instead of the much faster GeForce 8800 GTX or Ultra cards, we lavished praise on its innovative industrial design, supremely quiet cooling apparatus, and—most significantly—its ability to run either two Nvidia cards in SLI or two Radeon cards in CrossFire on an SLI motherboard.

That unprecedented flexibility prompted us to request a matched set of Blackbirds from HP, each equipped with an Intel Core 2 Extreme QX6850 quad-core CPU (3GHz, overclocked to 3.33GHz), 2GB of Corsair Dominator XMS2 DDR2 RAM, and three Western Digital 160GB Raptor hard drives (in RAID 0). All of this was plugged into an Asus Striker Extreme Nvidia nForce 680i SLI motherboard.

We asked HP to configure one rig with two ATI Radeon HD 3870 cards in CrossFire and one with two Nvidia GeForce 8800 Ultra cards in SLI. We also asked HP to provide us with two additional cards from each camp (more on that later). We chose the Radeon HD 3870 cards because they're based on the best GPU that AMD currently has to offer.

We soon realized we'd made a mistake in configuring the machine with 8800 Ultra cards, however, because those cards don't support HDCP on both links in their dual-link DVI connectors. Without that, you can't view encrypted HD video content in high definition on a 30-inch LCD (our screen choice for this challenge). The other problem was that the Ultras were too fast for our purposes: We couldn't come close to synchronizing frame rates in our gaming tests on the ATI and Nvidia machines.

So we moved down to Nvidia's 8800 GT. It supports HDCP on both links, the frame buffers on the cards we selected are the same size (512MB) as those on the 3870s, and the ATI and Nvidia cards would run our game benchmark at approximately the same speed (our objective being image-quality comparison, not frame-rate measurement).

We paired the Blackbirds with identical HP LP3065 30-inch LCD monitors. We set the brightness controls to the same values, and then calibrated the two monitors using a Pantone HueyPro calibration kit.

THE BENCHMARKS

We chose the cinematic built-in benchmark from World in Conflict to test DirectX 10 gaming performance (we remain unimpressed with Vista, but these GPUs were ostensibly designed for DirectX 10 performance). In order to achieve the smoothest frame rate, we reduced the game's resolution to 1280x800, set most of its values to medium, and turned off the water-reflection settings. This enabled both cards to run the demo at about 40 frames per second.

We had our test subjects view a sequence from the HD DVD disc *Blue Planet* to evaluate high-definition video quality. This IMAX film features spectacular clips filmed from above and around the planet, which made for a much more diverse viewing experience than a Hollywood movie would have provided.

For our final test, we asked our test subjects to examine a very high definition (2592x3888 pixels) portrait of a female model, shot with a Canon EOS-1D Mark III (we obtained the photo from Canon's website). See representative samples from each of our tests on the next page.

HP's Blackbird 002 enabled us to compare SLI and CrossFire videocard performance in otherwise identical rigs.

THE TEST SUBJECTS

We recruited our 21 evaluators from the ranks of the Future US staff, including editors and art directors from other print and online publications. We chose these individuals because of their in-depth expertise at evaluating image quality in all three of our test criteria.

THE TESTS

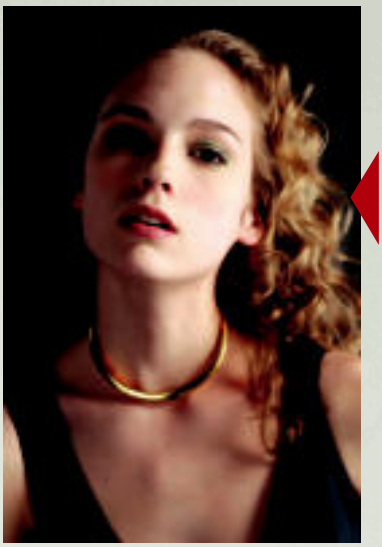
We set up the two Blackbirds in the *Maximum PC* Lab, with the monitors placed side by side, at the same height and at the same angle to the viewer. We sat each test subject on a rolling stool, so he or she could easily roll back and forth between the two monitors in order to avoid visual distortion caused by off-axis viewing angles.

The test administrator told each subject only that we were evaluating image quality; the subjects were not informed that we were evaluating videocards or any other hardware. Neither of the test rigs were outfitted with speakers. The test administrator asked each subject to express a preference for the image displayed on monitor A or monitor B or to express no preference for either. Subjects were expressly told that "no preference" was a perfectly valid opinion, but if they did choose A or B, they were asked to explain their rationale for that decision.

To reduce random chance, we conducted nine tests with our CrossFire system labeled as A and our SLI system labeled as B. We reversed the order for our next six tests, and we established two control groups of three tests each in which both A and B were CrossFire and then both A and B were SLI.

AN EYE ON VISUAL QUALITY

A closer look at our benchmarks—and why we selected them



HIGH-RESOLUTION DIGITAL PHOTO: EUSTACE

We selected this portrait because it was shot by a professional using a very high-resolution digital SLR camera (Canon's 10MP EOS-1D Mark III). We anticipated that our test subjects might discern differences in skin tone, hair color, black levels, and similar details.

HIGH-DEFINITION VIDEO: BLUE PLANET

We chose this disc for several reasons: The film was originally shot in IMAX format, and the digital transfer is excellent. We wanted video clips with diverse content, and this movie provides an abundance of it, ranging from sequences shot from the International Space Station to farmers setting fires in the Amazon rain forest to clear land for farming. We expected our test subjects might see differences in color rendering or spot decoding artifacts.

DIRECTX 10 GAME: WORLD IN CONFLICT

The shipping version of Massive Entertainment's sumptuous RTS World in Conflict has more DX10 eye candy than the beta version we've used in the past. We selected this game because it has a built-in benchmark that uses the game's engine to render an action-packed animation sequence. We thought our test subjects might see differences in color rendering, antialiasing, and lighting. We expressly told them not to evaluate frame rate or animation quality.

THE RESULTS

A breakdown of our test subjects' preferences when comparing content on ATI CrossFire with Nvidia SLI (control group results not included)

The first chart shows the subjects' responses for the DX10 game, the high-definition video clip, and the high-res digital photo. You can see whether they consistently picked one vendor over the other, or if they preferred different GPUs for different applications.

The second chart sums up the total number of responses for each videocard and the total number of no-preference responses in each category. A quick glance shows a slight overall preference for CrossFire, but turn to page 38 for a more detailed analysis of the results.

RAW RESULTS

	DIRECTX 10 GAME	HD VIDEO	DIGITAL PHOTO
SUBJECT 1	CROSSFIRE	CROSSFIRE	CROSSFIRE
SUBJECT 2	CROSSFIRE	NO PREFERENCE	CROSSFIRE
SUBJECT 3	SLI	SLI	NO PREFERENCE
SUBJECT 4	SLI	NO PREFERENCE	CROSSFIRE
SUBJECT 5	CROSSFIRE	CROSSFIRE	CROSSFIRE
SUBJECT 6	SLI	CROSSFIRE	SLI
SUBJECT 7	NO PREFERENCE	CROSSFIRE	SLI
SUBJECT 8	CROSSFIRE	NO PREFERENCE	NO PREFERENCE
SUBJECT 9	CROSSFIRE	CROSSFIRE	NO PREFERENCE
SUBJECT 10	CROSSFIRE	SLI	SLI
SUBJECT 11	CROSSFIRE	CROSSFIRE	CROSSFIRE
SUBJECT 12	SLI	SLI	SLI
SUBJECT 13	SLI	SLI	NO PREFERENCE
SUBJECT 14	SLI	SLI	CROSSFIRE
SUBJECT 15	CROSSFIRE	CROSSFIRE	NO PREFERENCE

CUMULATIVE SCORES

	CROSSFIRE	SLI	NO PREFERENCE
GAME PREFERENCES	8	6	1
HD VIDEO PREFERENCES	7	5	3
DIGITAL PHOTO PREFERENCES	6	4	5
TOTAL	21	15	9

IN THEIR OWN WORDS

Unvarnished opinions from our test subjects

We went to great lengths to avoid influencing our test subjects one way or the other. We gave them minimal instructions, and we made it clear they shouldn't feel pressured to choose A over B or vice versa.

Our first subject, a female art director, immediately pointed to monitor A, which happened to be the CrossFire rig (we randomly reversed the test setup between subjects) and said, "That one looks sharper. Monitor B looks a little fuzzy, and I think monitor A has better color quality." Moving on to the HD DVD test, this same subject pointed to monitor B, the SLI rig, and said "The video on monitor B seems more saturated, but the color in monitor A looks more accurate." This same subject voted for CrossFire in the portrait test, making a clean sweep for AMD.

Many of our other subjects had a more difficult time choosing a favorite. A male editor at one of our gaming magazines preferred Nvidia's gaming visuals, saying, "The tank looked as though it had more detail, but the difference is very small." He picked AMD, however, when it came to evaluating the digital photo: "The color temperature is very subtly higher," he said, "and the highlights in the model's hair look more golden on monitor B (the SLI rig)." When it came to the HD video test, he expressed no preference at all.

Although none of our subjects picked the SLI rig as their preference across the board (three did so for the CrossFire machine), that didn't stop some individuals from expressing strong preferences for Nvidia in each of the three categories. "The colors on monitor B look richer," said another male editor, referring to the digital photo displayed by the SLI rig, "and I feel like I'm seeing more texture because of that."

While watching a segment on slash-and-burn farming practices on the HD DVD, many of our observers noticed that the flames on the SLI rig were deep red, while the CrossFire machine rendered the fire more orange. The majority of these subjects expressed a preference for the CrossFire rig, explaining that the orange fire looked more natural.

Despite all our assurances that expressing "no preference" was a valid opinion, nearly everyone in our control group insisted they could see differences in image quality, despite the fact that three of them were unknowingly comparing SLI to SLI, and three others were comparing CrossFire to CrossFire.

WHAT WE LEARNED

Beauty is in the eye of the beholder, so everyone's a winner

We pride ourselves on making binary recommendations, but that's impossible in this scenario unless we also take speed into account. While it's true that our test subjects leaned slightly toward AMD's image quality, awarding AMD 21 wins to Nvidia's 15, the margin of victory in each category is just two votes. That gives AMD a slight edge at the $250 price point, but it leaves Nvidia unchallenged at every higher segment.

THE GAME TEST

Our subjects had the strongest opinions when it came to gaming performance, with eight expressing a preference for ATI CrossFire, six preferring Nvidia SLI, and only one citing no preference for either solution.

But does it really matter? The Radeon HD 3870 is the best GPU that AMD has to offer today, and Nvidia has three pricier SKUs capable of beating the 3870 to a bloody pulp: the revamped 8800 GTS, the 8800 GTX, and the 8800 Ultra. If you're a hardcore gamer, would you be willing to take a major performance hit in order to render your game experience just a wee bit more shiny and colorful? We didn't think so.

THE HD VIDEO TEST

Seven of our experts preferred AMD's video performance, compared with five who fancied Nvidia's; three expressed no preference for either solution. As odd as it sounds, many people had strong opinions about the color of the fire in the video sequence we showed them. But if you decide to go with one of Nvidia's faster GPUs, be aware that the 8800 GTX and 8800 Ultra are incapable of offloading all the HD video-decoding chores from the host CPU. More importantly, neither of these cards is equipped with dual-link DVI connectors that have HDCP support on both links (the Radeon 3850, Radeon 3870, GeForce 8800 GT, and G92-based 8800 GTS all do), making HD DVD and Blu-ray a no-no.

THE DIGITAL PHOTO TEST

It's a coincidence that the same margin of two opinions separates those who preferred AMD's digital-photo performance (six favoring) over that of Nvidia's (four favoring). We find it more interesting that five people expressed no preference in this category—more than the other two categories combined. We had predicted that having the subjects stare at a static image would result in nearly everyone judging one or the other solution to be superior.

MIXED OPINIONS

Only four of our 15 evaluators gave either AMD or Nvidia a win across the board; of the 11 with more mixed opinions, five leaned toward Nvidia (giving the 8800 GT the nod in two out of three categories) and four leaned toward AMD (all of whom favored its game-image quality). Three people's opinions were truly mixed, expressing a preference for CrossFire in one category, SLI in another, and no preference in a third.

THE CONTROL GROUP

We were surprised that only three of the six people in our control group expressed no preference between display A and display B—and in only one category each at that. Since they were unknowingly comparing identical rigs, we thought nearly everyone would admit there was no difference between the two displays. Since most of our subjects are professional critics, we suspect that they felt an inherent obligation to discern some difference between the two displays they were staring at (despite our assurances to the contrary).

The control group did help eliminate the display itself as a variable: If the monitors had colored our evaluators' opinions, the votes would have been lopsided in favor of one or the other. Of the control group's 18 opinions, nine favored monitor A, six favored monitor B, and three expressed no preference.

THE BOTTOM LINE

The good news for anyone shopping for a new videocard is that you don't need to sacrifice image quality for performance. Based on our blind tests, the GPUs from both AMD and Nvidia deliver similar visual quality with games, high-definition video, and digital photos.

That's good news for AMD, too, because now the company need only worry about catching up on one performance metric: frame rate. Unfortunately, we don't think CrossFireX is going to be a panacea in the interim. Running four moderately powerful videocards in one box will never be as cost effective as building a rig with one super-powerful GPU—especially if the CPU in that box is an Intel quad core. Sorry, Phenom.

That leaves Nvidia in the catbird seat—again. But it won't have the perfect solution either until it replaces the 8800 GTX and 8800 Ultra with parts that support HDCP on both links of their dual-link connectors and that are capable offloading all HD video decoding from the host CPU. MPC

FINALLY...

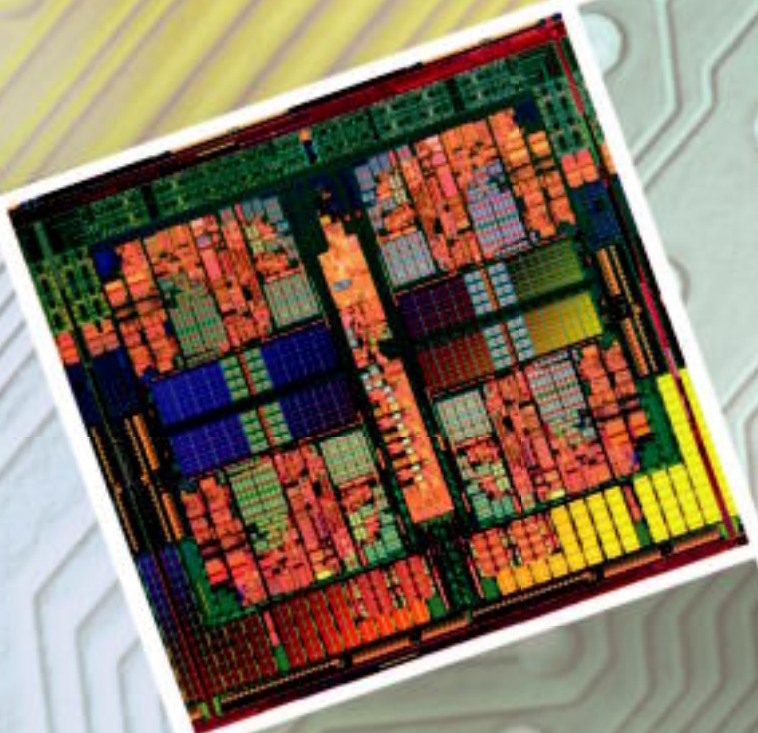
After months of trash talking—and delays—AMD's new CPU takes to the field at last

As any supporter of a losing sports franchise knows, it ain't easy being a superfan. For the last two seasons, AMD loyalists have watched Intel's Core 2 Duo and Core 2 Quad embarrass the Athlon 64 and QuadFX off the field. Yet devotees have chanted the refrain of the truly faithful: Come next season, baby, watch out!

Well, it's next season and AMD's chance to prove that it's still a contender is finally here. This month, we bench, dissect, and ponder the hell out of AMD's new CPU to find out if the Phenom lives up to its name.

BY GORDON MAH UNG

PHENOM



The Scoop on Phenom

Before we get down to the business of benchmarking, here's the backstory on AMD's new CPU

Q How do you pronounce Phenom?

A It's *fee*-nom, not *fuh*-nom.

Q What advances does Phenom offer?

A Phenom is AMD's first quad-core processor and is touted as a "true quad core." Based on a 65nm process, Phenom uses an enhanced version of the stellar K8 Athlon 64 core, which features many of the same "wider and faster" techniques as Intel's Core 2 Duo. Improvements over the Athlon 64 include the ability to execute SSE instructions in 128-bit chunks versus 64-bit. Cache speed gets a bump, as well, with L1 going from 16 bytes per cycle to 32 bytes per cycle, and L2 going from 64 bits per cycle to 128 bits. AMD also spends silicon on increased floating-point performance; a few new instructions; HyperTransport 3, which nearly quadruples the bandwidth over previous implementations; and more L3 cache.

Q What's meant by "true quad core"?

A Each Phenom features four execution cores on one single, contiguous die. Architecturally, it's far more elegant than Intel's quad core, which fuses two dual-core chips in a CPU and forces the dual-core islands to talk to each other over the front-side bus. Phenom was designed from the get-go as a quad chip, and each core communicates at HyperTransport 3 speeds—several orders of magnitude faster than Intel's front-side bus. All the cores can also share data stored in the L3 cache, so a core would have to reach out only to the L3 instead of the much slower system RAM in certain applications. This adds up to a chip that, on paper, seems to at least equal—if not exceed—Intel's Core microarchitecture.

Q What clock speeds will Phenom come in?

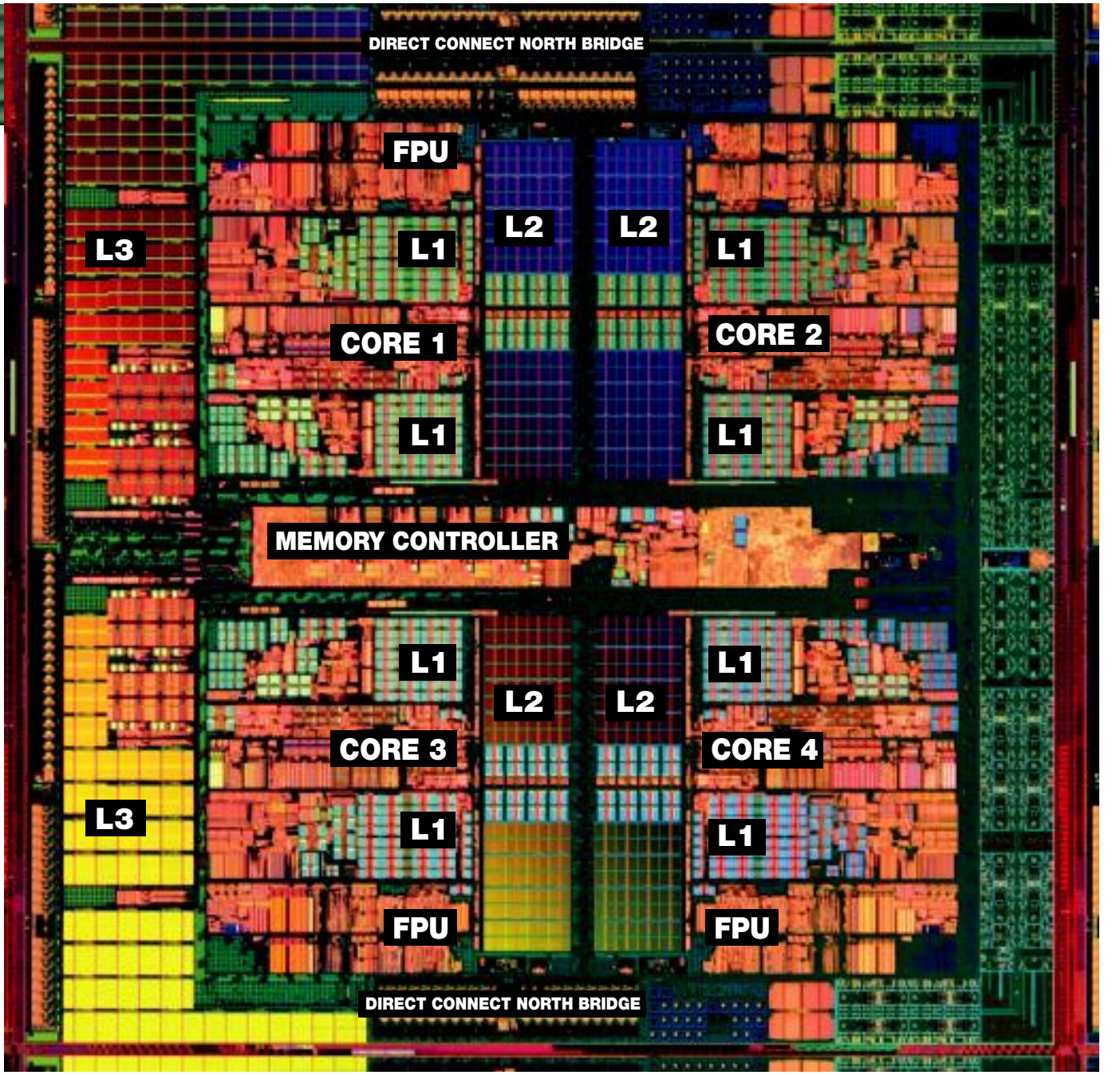
A Just two speed grades will initially be available: a 2.2GHz Phenom 9500 and a 2.3GHz Phenom 9600. In a few months, two additional speeds will be offered: a 2.4GHz Phenom 9700 and a 2.6GHz Phenom 9900. While all feature the same microarchitecture and cache amounts, there are key differences. The 9500 and 9600 are much cooler at 95 watts apiece. The 9700 increases to 125 watts and the 9900 hits a Prescott-like heat dissipation of 140 watts. You do get something in return, however. The 9900 will run its HyperTransport link at 4GHz compared to 3.6GHz in the lower-clocked parts, and its memory controller runs a bit faster at 2GHz versus 1.8GHz in the others.

Q Why are only two of the four CPUs available now?

A AMD's true quad-core approach sounds great on paper but it's also directly responsible for delays in getting the chip out and hitting higher clock speeds. We'll remind you of the four-leaf clover analogy: While Intel makes its four-leaf clovers by fusing a pair of two-leaf clovers, AMD grows all-natural four-leaf clovers. Unfortunately, the latter are much harder to come by. AMD has admitted that problems at the fab are the reason for the late launch of Barcelona—the Opteron quad core—and with Phenom. And

THE TOP CPUS FROM AMD AND INTEL COMPARED

MODEL	ATHLON 64 FX-74	ATHLON 64 X2 6400+ BLACK EDITION	PHENOM 9600	PHENOM 9900	INTEL CORE 2 QUAD Q6600	INTEL CORE 2 EXTREME QX6950	INTEL CORE 2 EXTREME QX9650	INTEL CORE 2 QX9770
CLOCK SPEED	3GHz	3.2GHz	2.3GHz	2.6GHz	2.4GHz	3GHz	3GHz	3.2GHz
L1 CACHE	128KB	128KB	512KB	512KB	128KB	128KB	128KB	128KB
L2 CACHE	2MB	2MB	2MB	2MB	8MB	8MB	12MB	12MB
L3 CACHE	N/A	N/A	2MB	2MB	N/A	N/A	N/A	N/A
FRONT-SIDE BUS	N/A	N/A	N/A	N/A	1,066MHz	1,333MHz	1,333MHz	1,600MHz
EXECUTION CORES	2	2	4	4	4	4	4	4
PROCESS TECHNOLOGY	90nm	90nm	65nm	65nm	65nm	65nm	45nm	45nm
TRANSISTORS	227 million	227 million	450 million	450 million	582 million	582 million	820 million	820 million
DIE SIZE	230mm^2	235mm^2	285mm^2	285mm^2	286mm^2	286mm^2	214mm^2	214mm^2
PRICE PER 1,000	$300	$220	$283	TBD	$266	$1,000	$1,000	TBD
INTERFACE	Socket F	Socket AM2	Socket AM2	Socket AM2	LGA775	LGA775	LGA775	LGA775
RATED TDP	125 watts	125 watts	95 watts	140 watts	95 watts	130 watts	130 watts	136 watts
DUAL SOCKET COMPATIBLE?	Yes	No	No	No	No	No	No	No



AMD's "true quad core" jams all four cores onto a single 65nm, 285mm² die. In addition to other core-efficiency enhancements, AMD now uses a shared 2MB L3 cache that runs at the same speed as the memory controller, which is currently 1.8GHz or 2GHz.

of the CPUs that AMD is able to produce, not enough reach 2.4GHz or 2.6GHz to launch the chips right now—thus the initial 2.2GHz and 2.3GHz CPU rollout.

Q Will Phenom work in my existing motherboard?

A Phenom is designed as a Socket AM2/Socket AM2+ chip and should, therefore, drop right into the majority of existing motherboards, provided the motherboard maker updates the BIOS—and didn't screw up on the board design (see our sidebar on page 48).

Q Does Phenom have the same RAM issues that DDR2 Athlon 64s did?

A No. AMD corrected the issue that limited the DDR2 Athlon 64s to whole-number RAM divisors. This, in essence, would force DDR2/800 RAM to run at DDR2/766. Phenom CPUs use a separate clock for the memory controller, so memory will run at its intended speed. Consequently, however, the memory controller no longer runs at the core's speed. The memory controller on the 2.6GHz Athlon 64 FX-60 runs at 2.6GHz. On the 2.6GHz Phenom 9900, the memory controller runs at 2GHz and notches down to 1.8GHz for the 2.3GHz Phenom 9600. It's not clear if or how this impacts memory performance; it's still a good clip faster than what the memory controller runs at in competing Intel machines, where that part is located in the north bridge.

Q What about online reports that AMD's CPU contains a bug?!

A First, every CPU released, and probably every piece of silicon, has bugs. Companies call them "erratum." However, there are bugs and then there are *bugs*. In the case of

Phenom, a last-minute big mutha of a bug was found in the translation lookaside buffer (TLB), a small cache used by the CPU to manage memory. AMD says that under very heavy workloads, such as in virtualization, the TLB bug could cause the system to hard lock. The company initially said the TLB bug was the reason it pulled the 2.4GHz and 2.6GHz Phenoms from launch but later recanted the statement, citing the aforementioned yield and volume issues.

Q Is there a fix for the bug, and how might that affect performance?

A A fix can be made through the BIOS, and AMD has informed board vendors how to implement the workaround. How much the BIOS change affects performance is hard to say. We, unfortunately, could not test the TLB patch, as it's unclear whether our BIOS had the workaround implemented (we suspect it did not). Furthermore, AMD is forbidding board vendors from letting users toggle the workaround on and off in the BIOS. The website Techreport.com tested boards with and without the patch and reported that, depending on the test, the performance decline with the patch was anywhere from 0 to 60 percent.

Q How does AMD answer these claims?

A AMD says the bug is so esoteric that it is unlikely to lock the system. That's why the company is pledging to let you toggle the patch on or off in a future update of the company's Overdrive application. We must point out, however, that the bug is severe enough that AMD is reportedly delaying a ramp up of quad-core Opteron sales until it has a silicon-level fix, which won't be until later this year. At that time, AMD will also release a 9550 and 9650 with updated silicon.

Q Did you experience the TLB bug in testing?

A We don't know. We can say that the first Phenom CPU we received ran at only a third of the performance of an equivalent Intel CPU. That chip eventually went back to AMD for examination and we received a second CPU that performed more to our expectations. We tested the chip at various clock speeds and did experience two hard locks that could not be explained. We can't say if the lockups were related to the TLB bug or simply immature drivers and BIOS. It does make us wonder if this problem is more serious than AMD has stated.

Q If reviews are based on CPUs without the patch, doesn't that misrepresent the CPU's performance?

A As old Ben said: "That depends on your point of view." Because the 2.6GHz Phenom 9900 won't ship until the winter begins thawing out, AMD will have updated "B3" silicon in place, and the performance numbers you see for the current chip should be representative. Of course, if you bought the Phenom 9500 or 9600 the day they came out, the performance numbers you achieve will likely be out of sync with those in most reviews, which were likely conducted without the fix in place. If, however, AMD is right and it's very difficult to run into problems, you can simply flip off the TLB fix (when the updated Overdrive app is available) and get performance closer to what you're seeing in reviews for the 2.3GHz part.

Q Is Phenom faster than Intel's part?

A You'll have to read our final benchmark report for the full verdict on performance, but the short answer is no. While the chip was close in some tests, AMD's fastest Phenom, which won't even be available for another few months, generally lags behind Intel's midrange 2.66GHz Core 2 Quad Q6700 chip. Mind you, that's virtually the same CPU Intel released more than a year ago using its older process technology.

Q AMD has nothing to counter Intel's top-end CPUs? What's up with that?

A AMD is spinning the Phenom story two ways: The first is that people need to stop thinking of CPUs as singular entities. Phenom, so it goes, is part of the Spider platform, which includes the quad-core CPU, AMD's new 790FX chipset, and the Radeon HD 3870 GPU in CrossFireX mode—four cards running in tandem (see the sidebar below). Sure, AMD screwed the pooch getting Phenom clock speeds up and yields higher, but would you rather spend $2,000 on just a Core 2 Extreme and 2GB of DDR3 or a reasonably performing Phenom with *four* Radeon HD 3870 cards in it? Four!! AMD's alternate spin is that, yes, it lags behind Intel today, but it'll be back in the game eventually.

Is AMD's Spider the Model of the Future?

The PC is no longer about a CPU or GPU in isolation, it's about "platforms," says AMD. And the company's Spider platform gives us a glimpse of what that means. Spider is based on the new 790FX chipset, which will support up to four Radeon HD 3870 cards in CrossFire and the quad-core Phenom—all for a pretty low price. AMD predicts that you'll be able to build a quad-GPU machine with a quad-core Phenom for less than $2,000. If you went for Intel's Extreme CPU, you'd spend $1,000 for the CPU and another $500 for the DDR3, leaving you just $500 for the rest of the components.

AMD says Spider is just a preview though. Ultimately, the company plans to have graphics cores integrated with x86 cores, making the platformization of the PC a foregone conclusion. Don't believe it? Intel, which currently has x86 CPUs and chipsets, is heavily investing in graphics as well, and has also said it will eventually offer a product with a graphics core integrated into the CPU.

What's not clear is how this will affect the salad bar formula we currently use for building a PC. Will platforms that have you order meal A or meal B replace our pick-and-choose world? Stay tuned.

AMD's Best Message Is Compatibility

AMD's AM2 Socket

While AMD hit a rough patch with the short-lived Socket 940 and Socket 754 platforms, lately it's been solid when it comes to providing an upgrade path. If you had a Socket 939 board, you could easily go from a low-end CPU to a spendy single core. And when dual cores came out, you could just drop one of those suckers in the very same board and it worked too. The same goes for AMD's Socket AM2/AM2+ design. If you've been living with an older 90nm Athlon 64 X2 5000+ for two years, you should be able to update the BIOS and drop in a Phenom to get quad-core performance.

That's not guaranteed, of course. The company says board design issues, and even the size of the flash memory used to store the BIOS image, could have an impact on Phenom support. How do you know if your AM2 board will run the new CPU? Obviously, boards using AMD's new 790FX chipset will work, but there are two other ways to verify compatibility: Cruise AMD's website, **http://tinyurl.com/yrmmy4**, to see if the company has approved your board for Phenom yet. Or visit your motherboard manufacturer's website and check its CPU-compatibility list before you make a purchase.

AMD has learned from its prior mistakes. Many Socket 939 users felt burned when the company made a quick transition to AM2 and turned the fab taps off on S939 CPUs. When AMD moves to DDR3 in 2009, it expects to have backward compatibility with AM2 and AM3 boards with its DDR3 CPUs. Overall, AMD gets a good grade for compatibility even if performance is a disappointment.

Q Does that argument about four GPUs hold any water?

A Until we actually test four Radeon cards in a box (no drivers were available to do so at press time), we can't give you a definitive answer, but we're not sure it's actually enough to beat two GeForce 8800 Ultra (or even GTX) cards when combined with Intel's fastest Core 2 Extreme CPUs. And in all things other than gaming, the Intel system will easily outclass the Phenom 9900. So we're pretty skeptical about such a configuration outboxing an SLI/Core 2 Extreme box.

Q How well does Phenom overclock?

A It will vary from chip to chip, of course, but Phenom is not shaping up to be a great overclocker today. We didn't get very far with our engineering sample chip and few other reviewers have either. And when you look at how the thermals ramp up for relatively minor speed increases, it's no wonder. Going from 2.3GHz to 2.4GHz takes the thermals from 95 watts to 125 watts. Going from 2.4GHz to 2.6GHz jumps it up to 140 watts. Older AMD and many Intel enthusiast parts have high thermal ratings but only because they're anticipating users to overclock the hell out of them. We suspect that the increased thermals for the two faster Phenom parts are more related to AMD's issue at the fab.

Q So its graphics cards are slower and its CPUs are slower—has AMD simply ceded the high end?

A AMD tells us that it absolutely has not given up on the high end. Again, the company fully admits that it blew it on the Phenom clock speeds and yields, but says it is committed to turning the situation around. When that will happen isn't known. It might take until the company's 45nm process is online sometime this year or next to become competitive.

Q What's the deal with AMD's tri core?

A The tri core is being sold on the concept that if two is good and four is great, three is a perfectly attractive middle option. AMD's tri core is primarily aimed at people who don't want to pay for quad core but want some additional performance at a more affordable price. The CPUs are, as you might suspect, dies that won't pass muster as quad cores but work fine with one core turned off. While some view this as selling defective chips, AMD says it's business as usual. In the past, if a portion of a CPU's 1MB L2 was bad, it could be sold as a chip with 512KB or 128KB L2, with the offending portion turned off. Like the higher-clocked Phenoms, the tri cores won't be out until later in the year—they will carry model designators of 7 instead of 9. Since they're the same chip as a quad core but with one core turned off, you can expect performance to fall in between their quad- and dual-core brethren.

Q Is there any reason to even buy a Phenom?

A If you're a performance or overclocking freak, no. Intel is ahead and even AMD says so. But for folks with an existing AM2 board that supports Phenom (see sidebar on this page), the CPU is a very easy, relatively inexpensive upgrade that gets you performance beyond Athlon 64. That should give die-hard AMD fans some solace. You might also be interested in Phenom if you buy into AMD's Spider platform argument, but that's unproven technology at this point.

Q Where does AMD go from here?

A AMD's next stop is 45nm, which it says will be online at the end of this year. There's likely to be a shrink of the Phenom core with some enhancements to get the performance up, but AMD's CPU code-named Bulldozer will be the next chip to truly take on Intel. Bulldozer, which is due in 2009, will be a multicore design, but AMD hasn't revealed very many specifics. The problem for AMD is that Intel is expected to make another jump forward with its chip code-named Nehalem, which will adopt AMD's on-die memory controller and chip-to-chip communication techniques and feature four cores per die and an improved version of HyperThreading. With two quad-cores glued together under the heat spreader, a Nehalem would have up to 16 cores (eight real, eight virtual) available to the OS.

Phenom in Action

OK, enough about the CPU. Let's see what story the benchmarks tell

For our comparison, AMD provided an unlocked engineering-sample Phenom that we ran at 2.6GHz and 2.3GHz in Asus's new 790FX-based M3A32-MVP Deluxe board. We compared AMD's CPU to the original Intel 2.66GHz Core 2 Extreme QX6700 CPU that we received more than a year ago from Intel. While it carries the Extreme tag, the QX6700 is identical to the Core 2 Quad Q6700 except that it's unlocked. That let us run the chip at both 2.66GHz and 2.4GHz to simulate the performance of a Core 2 Quad Q6600. The board used for the Core 2 chip was EVGA's 680i SLI. Both machines featured DDR2 RAM clocked at 1,066MHz. Memory timing was manually set on both platforms and both used 150GB Western Digital Raptor hard drives and identically clocked GeForce 8800 GTX cards, as well as the same drivers. Once we were finished with the Phenom testing, we dropped in an Athlon 64 X2 6400+ for comparison. As we pointed out in the main story, we could not determine if the performance-crippling TLB patch was present in the Asus M3A32-MVP board we used, but we suspect it was not, so our performance for the 2.3GHz runs would be higher than that of a system with the patch applied. For our test, we did not trot out Intel's 45nm 3GHz Core 2 Extreme QX9650 or the company's new 3.2GHz Core 2 Extreme QX9770. We didn't even pull out Intel's older 3GHz quad-core—after the 2.66GHz Core 2 Quad beat up the Phenom, we decided to be merciful. And there was definitely no need to throw in 1,600MHz FSB chips or DDR3/1600. When one team is getting pummeled, you don't grind it further into the ground. You let it slink off the field with a modicum of pride intact.

THE FINAL VERDICT

After all the trash talking, all the "true quad core" pimping, the result is a chip that's slower than Intel's cheapest quad core. And more expensive to boot!

The sad part is that while Phenom will be viewed as a big yawner, it's not really a bad CPU. In fact, it's a respectable chip for encoding and most applications. And it's certainly damned faster than any Athlon 64.

But in the final tally, if you are into performance—and most enthusiasts are—Intel is the only game in town this season. There's simply no comparison. On the other hand, if you're vested in AMD and own a Socket AM2 board, it's probably worth considering a Phenom, as it gets you two more cores, bags more performance, and little more hassle than a BIOS update and a little thermal paste on your hand.

The more troubling issue is the cost to AMD's credibility. With its CPUs so far in the hole, does it have the resources and capability to make a comeback? MPC

BENCHMARKS

CPU	2.6GHz Phenom 9900	2.66GHz Core 2 Quad Q6700	2.3GHz Phenom 9500	2.4GHz Core 2 Quad Q6600	3.2GHz Athlon 64+ BE
CLOCK	2.6GHz	2.66GHz	2.3GHz	2.4GHz	3.2GHz
SYNTHETIC GAMING					
3DMARK06 OVERALL	11,787	**12,219**	11,299	**11,620**	10,687
3DMARK06 CPU	3,886	**4,237**	3,615	**3,837**	2,455
3DMARK05 CPU	**15,986**	15,450	15,244	**14,394**	15,901
VALVE PARTICLE TEST	72	**83**	67	**79**	44
GAMING					
FEAR LOW-RES	217	**272**	202	**241**	207
QUAKE 4 LOW-RES	160.4	**184.1**	147.6	**163.5**	140.4
WORLD IN CONFLICT LOW-RES	111	**136**	112	**141**	115
CRYSIS CPU LOW-RES	96.3	**131.2**	92.3	**123.2**	98.7
CRYSIS GPU LOW-RES	74.5	**97.3**	72.2	**92.2**	76.6
APPLICATIONS					
PREMIERE PRO CS3 (MIN:SEC)	19:48	**18:43**	21:00	**19:31**	33:25
PHOTOSHOP CS3 (MIN:SEC)	2:47	**2:19**	2:55	**2:28**	3:21
PROSHOW PRODUCER (MIN:SEC)	21:11	**20:03**	22:22	**20:39**	33:48
CINEBENCH 10	8,362	**9,583**	7,732	**8,699**	5,226
ADVANCED OFFICE PASSWORD BREAKER (HRS:MIN:SEC)	7:19:34	**5:56:02**	7:56:20	**6:35:27**	11:56:42
ENCODING					
MAINCONCEPT REFERENCE (MIN:SEC)	**32:23**	33:48	**34:23**	36:16	56:04
AUTOGK XVID (MIN:SEC)	13:36	**10:38**	14:12	**11:41**	17:20
AUTOGK DIVX 6.8 (MIN:SEC)	12:29	**10:07**	13:07	**10:57**	15:05
SYNTHETIC APPLICATIONS					
SCIENCEMARK 2.0	**1,525.67**	1,512.37	**1,440.34**	1,391.37	1,639.96
VALVE MAP COMPILE TEST (MIN:SEC)	2:52	**2:39**	3:05	**2:53**	4:56
PCMARK2005 OVERALL	8,423	**9,233**	8,340	**8,729**	7,657
PCM05 CPU	7,659	**8,587**	7,079	**7,738**	6,547
PCM05 MEM	4,479	**5,825**	4,257	**5,511**	5,244
PCM05 GPU	11,962	**12,783**	11,886	**12,677**	11,624
PCM05 HDD	7,788	**7,943**	7,767	**7,813**	7,754

Best scores are bolded.

Use Your Computer from Anywhere

Normal networking is for chumps. We'll show you how you can access your faraway computer as if it were sitting right in front of you!

TIME 00:15 HOURS:MINUTES

We'll set the stage. You're at work, toiling away on yet another spreadsheet for the Man, when you suddenly have a flash of inspiration. You've installed Peggle Deluxe at home, and surely a round of puzzle-ball action would make the day pass faster! But how are you ever going to access your computer and fire up your saved game?

It's easy to move files from your home computer to any location you want: That's what portable hard drives are for. But why use your legs when a simple program will let you manipulate any faraway computer using the mouse and keyboard sitting in front of you. Double-click folders. Create pretty Photoshop pictures. Transfer files. Private networks are the ultimate way to manage your computer from afar.

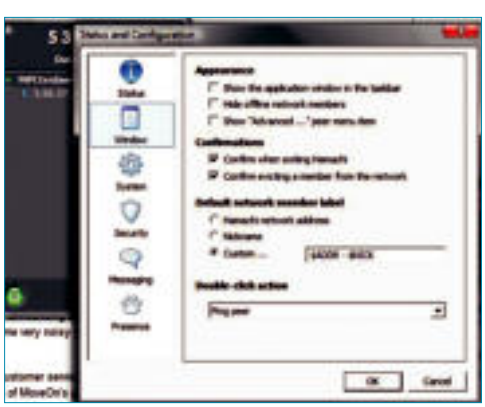
BY DAVID **MURPHY**

WHAT YOU NEED

- **TWO COMPUTERS**
- **ULTRAVNC**
  Free, www.uvnc.com
- **LOGMEIN HAMACHI**
  Free, www.logmein.com

1 Create a Virtual Network

If you're planning to connect to a remote computer, you first need to know where it is—and "in my house" isn't the answer you're looking for. In technological terms, you need the host machine's IP address. It's the unique identifier that's bestowed on Internet-attached computers by an Internet service provider. At least, that's the simple version. If you're running behind a router, the IP situation gets a little more complicated. And if you're trying to remote-control a machine at your workplace… well, things could get interesting. Unless you use Hamachi, that is.



Rather than fiddling with a bunch of complex settings, forwarding options, and other technological thaumaturgy, install the Hamachi client on each machine you want in the connection loop. This one-stop solution to network configuration creates a virtual private network (VPN) on top of your current configuration. Think of it as the difference between following a series of directions to get somewhere versus taking a teleporter that deposits you exactly where you want to go.

Installing the client itself is simple. Once you've finished running the executable, follow the onscreen directions to create your first (password-protected!) private network. Set Hamachi to run when Windows starts. This will save you the head-slapping you'd surely inflict on yourself the first time you try to remotely access your desktop only to find that you forgot to start Hamachi before heading out.

Make sure you give your computers descriptive names as well. If you're planning to include multiple rigs on the network, you'll definitely want better differentiators than "dave-desktop" and "dave-desktop2."

You can label computers via IP address if you're a real network nerd. We prefer an IP address followed by a label such as "PC in Lab," which tells us exactly what we need to know.

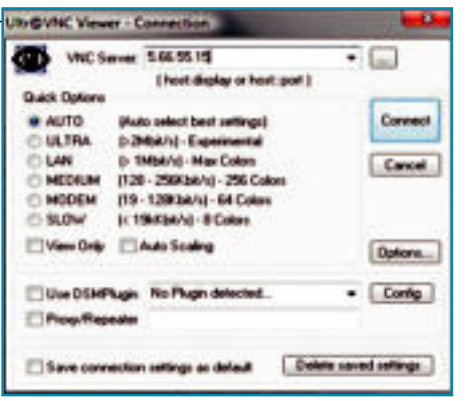
2 Install UltraVNC

Once you've got Hamachi up and running, you need to install UltraVNC, which actually handles all the remote interface fun. Installing it is as easy as clicking a mouse button a few times. If you want the program to run when Windows starts, select the option to register UltraVNC as a system service—unless you're using Vista; Microsoft's latest OS frowns when you try to do that. Vista users will want to copy the shortcut to UltraVNC from the program's Start Menu folder into the Startup folder. You'll get UltraVNC when you log in to Vista, and better still, you won't see any error messages.

You'll see an icon in the lower-right corner of your taskbar when UltraVNC's running. Right-click it and select UltraVNC's Administrative Properties. Most of the options can be left at their defaults, but a few offer handy upgrades to UltraVNC's network operations. If you're accessing a computer located in a public location, you can prevent

local users from disabling an UltraVNC connection. You can also turn off a local user's ability to type, move the mouse, or even edit UltraVNC settings. Most importantly, this is the screen where you set UltraVNC's password—without one, all someone needs is your IP address to take over your machine.

3 Get Connected

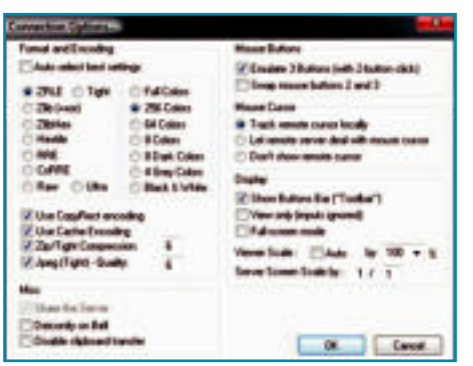


You can quick-set your connection-specific encoding and coloration options on the tiny viewer, but the Options menu offers you far more control over your network session.

To connect your UltraVNC Server computers you also need the UltraVNC Viewer included in the initial installation. But before you run this program on the computer that's doing the connecting, you'll want to double-click the Hamachi icon in the Windows toolbar and connect to your private network. You'll now see why installing Hamachi is a good idea: Look at the window and copy the IP address of the machine you're connecting to into the UltraVNC Viewer window.

And that's it! It's the easiest way to figure out a machine's IP address without physically being at that machine or establishing a static IP.

4 Tweak Your Connection's Settings



The specific encoding techniques are complicated. Your best bet is to run through the list to see which gives you the best performance on your connection.

Now that you've connected to your faraway machine, you might very well be staring at an image of your desktop with scroll bars attached to the sides of the window. It's an annoying way to manipulate your host machine, so here's how to change it—and a raft of other options.

At the top of the UltraVNC Viewer window is a series of icons. Select the one that looks like Earth with a gear over it; it should be third from the left. Clicking the icon pulls up the options for the UltraVNC Viewer client. The program is initially set to replicate a 100-percent duplicate of your desktop, which can lead to the scroll bars on your window. Crank this value down by selecting a different percentage for Viewer Scale and you'll be able to fit your remote desktop on your current display.

UltraVNC is set to automatically select the remote image's encoding settings, but you can manually adjust the options for greater control and speed. If your mouse response time is slow, select the option for the remote server to deal with the mouse cursor or disable the cursor image entirely.

If your connection is pokey, first try selecting different compression algorithms to find one that best fits your needs for quality and speed. To maximize the latter, nix the colors—pull up your remote computer in grayscale if you have to, as it'll reduce the amount of bandwidth required to transfer the desktop image from your remote box to you.

how2mini

CREATE ANIMATED SPRAYS IN TEAM FORTRESS 2 AND COUNTER-STRIKE

Frag and tag in four easy steps

Expressing your individuality online can be difficult, especially if you're a gamer. While running and gunning your way through games like Counter-Strike: Source or Team Fortress 2 it's easy to get lost in the crowd. But leaving your mark on the world can also be easy. Animated sprays are a great way to tell your enemy that not only have they been pwned but that you're the one responsible.

Custom animated sprays were limited to the most elite players in the days of Counter-Strike 1.6, but now that Source is here, that's changed. Prepare yourself for a quick and easy way to make your own spray and let the lolcats run wild!

1. CLEAN UP YOUR PICTURE OF CHOICE The hardest part of making your own animated spray is deciding what pictures to use. The choice is tricky, as the result should represent both your unique personal style and your declaration of badassedness.

Once you've chosen your picture, place it on a transparent background using Photoshop. Open the original image, then press CTRL+A to select the entire image, press CTRL+C to copy it, and then create a new canvas by pressing CTRL+N. The new canvas will be the exact same size as the image on your clipboard, so you can simply paste it by pressing CTRL+V. It's a good idea to make a backup of your image now in case you make a mistake later.

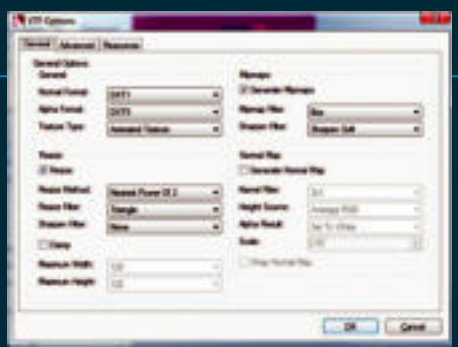
Cut out the area of the picture that you want to be transparent with the lasso tool; then press Delete. Don't worry about getting rid of everything at once, just remove unwanted background one chunk at a time. For bits of the image that are the same color, you can use the magic wand tool. This lets you select adjoining pixels that are the same color quickly and easily. Repeat this process for each image you want in your spray. When you've clipped out all the background that you don't want, resize each image to 128 pixels wide by using the Image Size panel (CTRL+ALT+I).

Make sure that the background contents are transparent; otherwise, when you load up your spray online there will be a big, ugly white background!

2. CREATE THE BACKBONE OF YOUR CUSTOM SPRAY Once you've clipped your pictures, open them up side-by-side in Photoshop. This is the best time to add text to your spray. With the separate frames next to each other it's easy to see exactly what your finished product will look like in-game. Due to the Source engine's 120KB spray file-size limitation, however, you probably won't be able to create more than five frames. Make sure everything looks correct and save the finished 128x128 images in one directory; name them so that they will remain in the proper order.

Put your files side by side to make sure everything looks right.

3. CONVERT Now that all your images are properly sized, you're almost ready to create the spray. Open VTFEdit (**http://tinyurl.com/2caps8**) and go to File > Import. Control-click each of the images you want to use and click OK. Select the default options on the Import screen and press OK. To get a high-speed preview of your spray, go to the Image tab and press Play. If everything looks right, go to the Info tab and make sure that the overall size of the spray is less than 120KB. Then save the file in C:/Program Files/Steam/steamapps/<your username>/team fortress 2/tf/materials/VGUI/logos for Team Fortress 2, or your C:/Program Files/Steam/steamapps/<your username>/counter-strike source/cstrike/materials/VGUI/logos folder. Once you've saved the file, go to the Tools menu and click Create VMT file, then save the resulting file to the same folder.



VTFEdit's import process asks you all sorts of scary questions. Fortunately, you can just skip over them by pressing OK.

Now, your files should be in order, and you can fire up your game and enjoy your handiwork. From the game's main menu, go to the Options menu and select the Multiplayer tab. Your new spray should be available in the drop-down list. Before you venture into the wilds of the Internet, you'll want to test your spray in a private place, so create a private server and make sure your spray works properly there. If you make adjustments to the spray, you'll need to disconnect and reconnect to the server in order to see any changes. Once you're happy with the way things are working, fire up your game and get spraying!

4. NOT FEELING ANIMATED? Don't sweat it! Cut out your picture and save it as a targa (.tga). Size doesn't matter; just save it to a place where you can easily find it and then import the image via Counter-Strike: Source's or Team Fortress 2's in-game menu. MPC

Ask the Doctor

Diagnosing and curing your PC problems

A-V-C-H-D H-E-L-P

I recently settled on the Panasonic AVCHD HDC-SD1 digicam, which received a 9 verdict in the November 2007 issue. I have now begun the daunting task of finding a software solution to edit, compress, and burn the film I shoot. As I see it, there are only two choices that support AVCHD and do what I need: Nero 8 Ultra and Pinnacle 11. But which should I pick? I want to edit the footage I shoot, keep it in high def to burn to an HD DVD disc, or compress it to a lower resolution/quality to play on a website. The more options, the better!

—Rob King

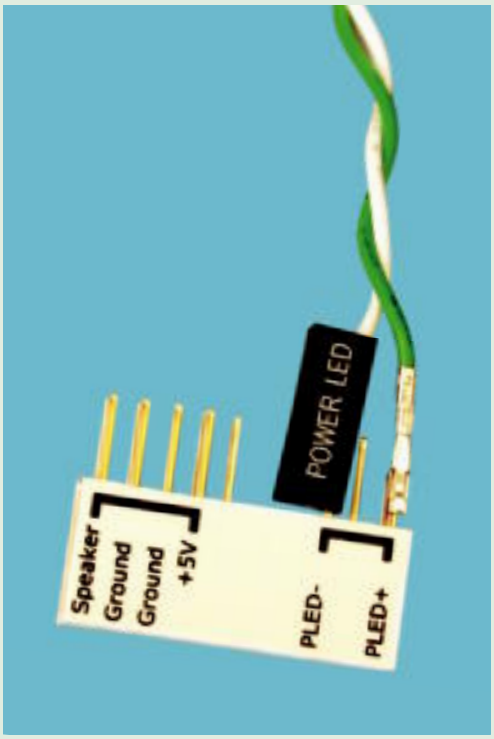
Actually, quite a few other applications also support AVCHD editing, including Corel Ulead VideoStudio 11 Plus, Sony Vegas Studio Platinum 8, and Cyberlink PowerDirector 6. Depending on the program, you may have to buy the full version of one of these apps in order to access the AVCHD support. Software companies typically pay a third party for the codec based on the number of units sold. With many of today's video editors, you're prompted to activate a codec only if you need it. This saves the company (and supposedly you) cash, as the software developer pays only for the codecs its customers use.

For the most part, the editing software's functionality will be the same whether you're working with DV, HDV, or AVCHD content. You should make your pick based on the feature set of the application. The Doctor has not used the latest version of Vegas, but he is partial to Pinnacle's Studio 11, which is much improved from the previous version.

CONNECTING THE COSMOS

Being the power-hungry person I am, I decided to build a new machine based on your Dream Machine (September 2007). I'm having two small issues connecting the Asus Striker Extreme motherboard to the Cosmos case, and I'm curious how you guys resolved them. The first issue concerns the power LED coming from the case. It's a two-pin female connector; the motherboard requires a three-pin connector. I looked online and was able to find a store that sells a three-pin female to two-pin male power LED adapter/connector. Other people have suggested cutting the existing cable. Help?

—Ray Mileo



We separated the wires on our two-pin female connector to make it fit in the three-pin space provided by Asus's mobo Q Connector.

We didn't use the Striker Extreme board; we used an EVGA 680i SLI board. The Striker Extreme makes connecting front-panel features to the mobo easy by providing Asus's Q Connector, a small block of pins on a piece of plastic. You hook your front-panel connectors to this block and then plug it right into your motherboard. Should you need to pull the board out, all you have to do is pull the connector out as one single block.

To address the pin discrepancy with your power LED, you'll need to remove one of the female connectors, so you can attach them independently to the mobo's three-pin config. Use a small paper clip to pry out the plastic finger that holds in one of the female connectors. Next, plug each of the connectors independently into the Q Connector (as shown in the image) and then plug the connector into your motherboard.

HARDWARE OR SOFTWARE EAX?

Why is it that when I plug my Logitech Premium 350 USB headphones into my notebook and select Hardware and EAX for Battlefield 2, it actually sounds like EAX is working? Is this software emulation through Microsoft's built-in USB headset drivers, or does the hardware USB soundcard actually decode EAX? And what chip is actually in these damn things? I'm about ready to rip them open to see what makes them tick.

Finally, is it possible to get hardware decode EAX 5.0 in a notebook?

—Mark Miller

You didn't mention what operating system you're running, but if it's Windows Vista, there's no hardware audio support, as Microsoft removed that feature from this "gaming" OS. What you're getting is general audio that's perhaps enhanced slightly by the headset's drivers. It's a good sound, but not a great sound. If you use analog headphones, an EAX 5.0 card does add some worthwhile nuances. For example, it will allow you to crank BF2 audio all the way to Ultra, which allows 128 simultaneous sounds. But, sadly, there are no EAX 5.0-capable audio solutions for notebooks right now. Even Creative's X-Fi Xtreme Audio Notebook isn't a true hardware X-Fi and is capped at EAX 4.0 support.

THIS SOUNDS GREA… BRZZZ

I built a nice gaming rig with an EVGA 680i motherboard and a Sound Blaster Fatality 1 XtremeGamer Professional Series soundcard. The card works great for a few hours, or sometimes a few days, then all of a sudden, for no reason at all, the sound stops working. The card and drivers still appear in the device manager. Nothing changes. Once the sound stops working, I have to physically take the card out and reinstall it, then reinstall the drivers. Have you heard of any problems with this soundcard?

—Slick

The good news is that there is a known issue with the nForce 680i SLI and Sound Blaster X-Fi card. Unfortunately, neither Creative nor Nvidia has a definite solution for it. Creative officials told the Doc that the company had to resort to buying back problem machines because they could not reproduce, and thus

Ask the Doctor

Continued from page 54

fix, the sound issues. Most of those cases, however, were characterized by crackling, static, and distortion.

Nevertheless, there are a few steps you can take to try to eliminate the issue. First, make sure you're running the latest drivers from Creative's website. Second, make sure you have the latest BIOS from EVGA installed. A BIOS was released some time ago that supposedly addresses some of the X-Fi/nForce issues. You might also want to try running the card in a different PCI slot.

Remember that you must power down the system and discharge any residual power in the PSU before removing a device from inside the machine. If you are pulling the card out while the motherboard still has power to it (even if the PC is powered down), there is a chance you could damage components.

VIDEOCARD SMASH SOUNDCARD

I just installed a new Radeon 2900 XT videocard. After I installed the driver and rebooted my computer, my X-Fi card stopped working. What happened, and how can I get my soundcard back?

—Jenny McCabe

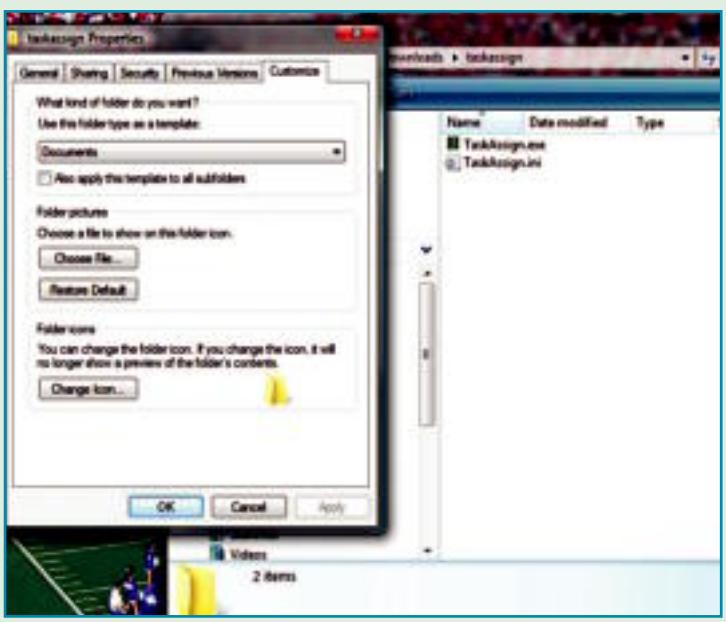
Your soundcard hasn't really stopped working, it's just that your videocard has usurped its authority. Don't worry, there's an easy fix. But first, allow me to explain what happened: Videocards based on AMD's Radeon 2000- and 3000-series GPUs have integrated audio capabilities, so they can output both digital video and digital audio over one cable using an HDMI adapter fitted to the card's DVI output.

This is useful if your monitor is equipped with an HDMI port and speakers and you want to use them, or if you route your audio and video signals through an A/V receiver that has HDMI inputs and outputs. In your case, it sounds as though you'd prefer to use your X-Fi card and external speakers. If that's so, all you need to do is open your Windows XP control panel and click Sounds, Speech, and Audio Devices. Next, click Sounds and Audio Devices, choose X-Fi from the Device drop-down menu, and click OK. If you're using Vista, your control panel choices will be Hardware and Sound, Sound, and then Manage Audio Devices. Click the Playback tab, select X-Fi, and click the Set Default button. These steps should return control to your X-Fi card.

ONE AT A TIME

Help! I used to be able to select all the files in a folder using Windows Vista, but I can only select one file now. What's up, Doc?

—Winston Fore



Selecting a healthy folder and clicking "Apply to All" won't necessarily fix problems across all your folders. Vista treats each folder type independently, unlike Windows XP.

Well, Winston, the Doctor is sad to report that Vista treats its folder themes differently than XP does. According to Microsoft, an application has added a key to the Windows registry that prevents you from selecting multiples of anything in that particular folder—no keyboard shortcuts, no drawing of mouse boxes, nothing. This likely happens on folders within a particular theme, so the Doctor wouldn't be surprised to hear that you're having the same issue across, say, all of your picture folders.

There are two ways to fix this: First, go to your annoying folder and select the View tab in Folder Options. Next, click the Reset Folders button. That should fix your issue, but you'll have to go back and spiffy up your folder settings to get back the look you just nuked.

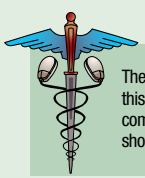
If that doesn't work, right-click the guilty folder and hit Properties. Then click the Customize tab and make a note of what type of folder Vista thinks it is. Go back to your desktop and make a new folder. Right-click it, hit Properties, and click the Customize tab again. Set this folder to be a different type than the annoying folder and click Apply. Then go back and set it as the same type as the annoying folder and hit OK. Now to overwrite the folder's characteristics, click the Tools menu in Windows Explorer and select Folder Options. Click the View tab, and select Apply to Folders. That should fix your problem.

THERE'S AN APPLE IN MY PC!

I am running Windows XP. In the directory C:\Documents and Settings\All Users\Application Data, there are Apple and Apple Computer folders. In each of those folders is a folder called Installer Cache. That Installer Cache folder contains old install files of iTunes, QuickTime, and Apple Mobile Device Support. Can I delete these without any repercussions?

—Mario Lia

The Doctor advises you to nuke these folders with extreme prejudice. They're leftover files from the many updates of your Apple software and are wholly unnecessary for your daily software operations. And if, by chance, you ever encounter an issue with files missing from Installer Cache, just go back and reinstall iTunes. Potential problem solved! MPC



The Doctor can't stand it; he knows you planned it. He's gonna set it straight, this techy hate. He can't stand doctoring when he's in here, because your computer deal ain't so crystal clear. So while you sit back and wonder why, you should be e-mailing questions to this Doctor guy: **doctor@maximumpc.com.**

White Paper: Power-Line Networking

Once dismissed as hokum, this LAN technology is finally coming into its own.

BY LEE **HAMRICK**

When it comes to networks, *Maximum PC* readers fall into two camps: Those who already have one (and want to expand it or extend its range), and those who wish they had one. Whichever category you fall into, power-line networking is finally becoming a viable alternative to Cat5 and Wi-Fi.

Power-line networking takes advantage of the unused bandwidth inside the copper wiring used to distribute electrical power throughout the home. Power-line adapters convert data into a carrier-signal format, so it can be transmitted from one device to another.

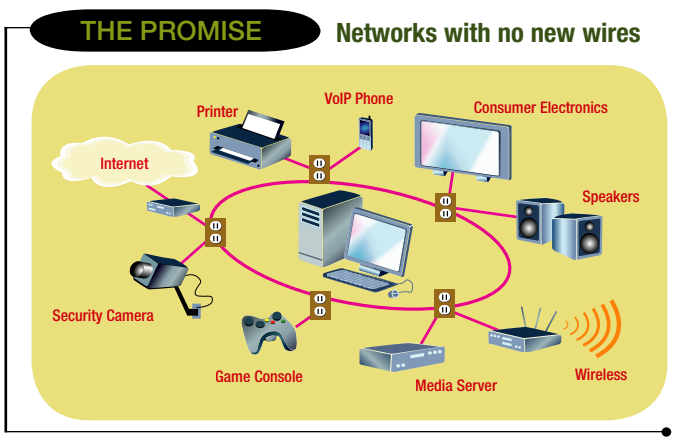
Since your house already has electrical outlets, there's no need to pull any new wires or drill any new holes. And those existing power cables are endowed with potential bandwidth that's much greater than what today's 802.11n Wi-Fi networks are capable of delivering. (And when you think about it, most Wi-Fi devices still depend on wires—even if only to power them.)

In an ideal world, all you'd need to do to assemble a network is plug your PC, DSL/cable modem, router, and peripherals into a wall jack and BAM! You'd have an instant network. It's not quite that easy, but the fact that it works at all is remarkable.

POWER-LINE PIONEERS

In the United States, home electrical systems operate on alternating current at a frequency of 60Hz. Power-line networking uses much higher frequencies—ranging from 2MHz to 30MHz—to carry data. Intelogis was the first company to offer power-line networking technology to consumers, but its Passport system proved to be slow and extremely sensitive to noise caused by appliances operating on the same power lines.

The problem was Passport's reliance on frequency-shift keying (FSK) to encode data carried on the network. FSK uses just two frequencies to encode the data in a binary system: one frequency for the 1s and a second for the 0s. If a large appliance or high-current device (such as a hair dryer) caused an electrical surge to step on either of those frequencies, the stream of binary data would be interrupted. The device transmitting the data would then have to resend the packets, causing significant congestion on the network.



New power-line networking technology should soon enable consumers to build robust data and A/V networks using their existing AC power lines.

Two consortiums are competing to establish a de facto power-line networking standard: the HomePlug Powerline Association (whose members include Intel, Motorola, and Texas Instruments) and the Universal Powerline Association (or UPA, organized primarily by communications chipset company DS2). A third group, the Consumer Electronics Powerline Communication Alliance, was established to promote the coexistence of power-line networking products that use different technologies. (CEPCA's membership roster includes nearly every major consumer-electronics manufacturer, including Sony, Toshiba, and Philips.)

Although products based on DS2 chipsets have proven extremely effective (and the company recently demonstrated a 400Mb/s product), a merged specification promulgated by the HomePlug Powerline Association and Panasonic won the most recent round of voting by the IEEE P1901 work group. Analysts blame the slow growth of the power-line networking market on the lack of interoperability between power-line networking products; if HomePlug gets the IEEE's seal of approval, DS2 will have a difficult time bucking the trend.

The HomePlug Powerline Alliance's baseline specification is derived from InTellon's PowerPacket system, which takes a very different approach to power-line networking than Intelogis's now-defunct Passport. Rather than streaming data encoded to just two frequencies, PowerPacket uses a spectrum ranging from 4.3MHz to 20.9MHz. These bands are organized into 84 "lanes" of traffic using orthogonal frequency-division multiplexing (OFDM) with forward error correction. OFDM uses a large number of closely spaced subcarriers, each of which is modulated using quadrature amplitude modulation (QAM). QAM conveys data by manipulating the amplitude of two carrier waves.

Since PowerPacket can send data over so many traffic lanes, the transmitting device will send redundant data on more than one subcarrier. If a power spike or excessive noise interrupts one lane of traffic, the data encoded in the other frequencies should still get through. The transmitter also adds redundant data to its messages, which is where forward error correction comes into play. The transmitting device sends a known preamble at the start of each data packet. The receiving device then compares that preamble to the actual data received. If there's a difference, the receiver can either try to correct the error or use one of the redundant streams. Garbled data doesn't need to be retransmitted unless both these methods are unsuccessful.

The use of frequencies outside the range of AC power explains why power-line network devices and surge suppressors don't play well together: The latter interpret the data-carrying frequencies generated by the former as electrical spikes that must be tamped down.

HOMEPLUG AV

HomePlug 1.0 is limited to throughput of 14Mb/s, which means it's inadequate for streaming high-definition audio and video. The improved Physical Layer (PHY) and Medium Access Control (MAC) technologies in the newer HomePlug AV and similar nonstandard

specification, however, enable a consumer to build a 200Mb/s network using the existing power lines in their home.

The MAC layer uses Time Division Multiple Access (TDMA) and Carrier Sense Multiple Access (CSMA) with AC line-cycle synchronization. TDMA enables several devices connected to the same network to transmit over the network and share its capacity; specifically, it allows these devices to share the same frequency channel by dividing the signal into different time slots. Each device then takes turns transmitting in rapid succession. The use of TDMA enables HomePlug AV to deliver Quality of Service (QoS) guarantees so that each network application gets the bandwidth and transmit/receive time that it needs.

CSMA is a protocol under which a device about to transmit first listens to the channel it's about to use to determine if it is in use. If the device senses that the channel is busy, it will defer its transmission; if the channel is idle, the device sends a message to all the other devices on the network not to use that channel. It then sends its data packet, waits for an acknowledgement that the packet was received, and releases the channel.

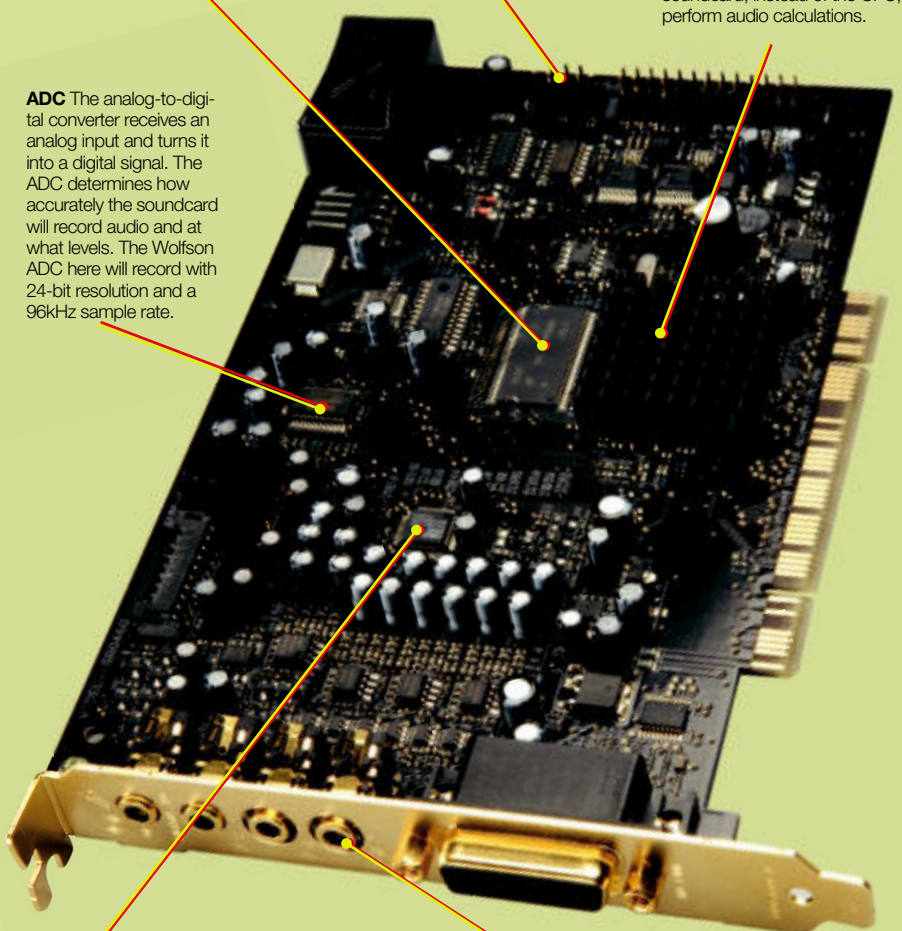
AC line-cycle synchronization enables a HomePlug AV network to identify and work around noise in power lines. General noise tends to fluctuate, but the impulse noise injected into the power lines by appliances such as refrigerators and air conditioners tends to be synchronous and of limited duration. HomePlug AV adapters use multiple time slots that are synchronized with the AC cycle, and they analyze line noise before loading bits into the carrier waves. This allows a HomePlug AV network to minimize the impact of power-line noise: If line conditions are optimal, each carrier wave can be loaded with different data to yield the highest possible bit rate; if line conditions are at their worst, every carrier wave can be loaded with the same data to ensure that the data arrives at its destination.

Where the original HomePlug spec used only QAM (which has eight unique analog phase/amplitude symbols), HomePlug AV utilizes a variety of modulation techniques based on line conditions: Binary Phase Shift Keying, Quadrature Phase Shift Keying, and 16-, 64-, 256-, or 1024-QAM. As its name implies, 1024-QAM has 1,024 unique analog phase/amplitude symbols and can represent 10 digital bits.

HomePlug AV equipment is compatible with HomePlug 1.0 equipment, but neither of these standards is interoperable with gear based on DS2's technology (or the relatively ancient Passport hardware, for that matter). You can, on the other hand, mix power-line networking technology with wired and wireless Ethernet products. MPC

Soundcard

The soundcard still rules the audio fidelity and performance roost. Here's a look at what makes the popular and powerful X-Fi series tick.



RAM Creative's X-Fi series includes a tiny amount of RAM (64MB in this case) that developers can use to store audio samples.

AD LINK The AD Link port connects expansion-bay items such as Creative's X-Fi I/O Drive.

DSP A digital signal processor, the meat of any true hardware soundcard, lies under this heatsink. The X-Fi's DSP packs 51 million transistors and 10,000 MIPS of power. This lets the soundcard, instead of the CPU, perform audio calculations.

ADC The analog-to-digital converter receives an analog input and turns it into a digital signal. The ADC determines how accurately the soundcard will record audio and at what levels. The Wolfson ADC here will record with 24-bit resolution and a 96kHz sample rate.

DAC The opposite of the ADC, the digital-to-analog converter turns a digital value into an analog waveform. The DAC is largely responsible for giving the soundcard its audio character and dictating how many channels the card supports. The Cirrus Logic CS4382 lets you output up to eight channels with 24-bit resolution and a sample rate of 96kHz, or with 24-bit resolution and 192 kHz sample rate in stereo mode.

PORTS These ports connect to the standard 1/8-inch speaker jacks common in multimedia designs. One port can also be used for digital I/O.

Any requests? What hardware—new or old—would you like to see go under *Maximum PC's* autopsy knife? Email your suggestions to **input@maximumpc.com.**

GORDON **MAH UNG**

Thinks ESA Is Long Overdue

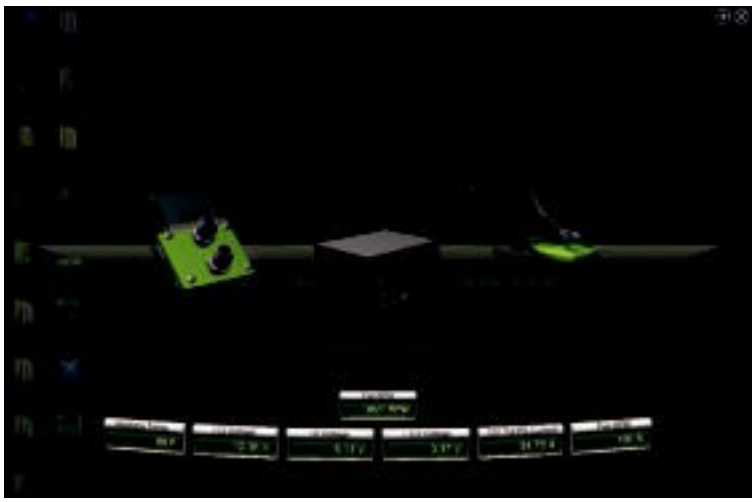
More knobs and gauges are a good thing

PC geeks like dials and gauges and greater hands-on involvement, so Nvidia's Enthusiast System Architecture (ESA) should come as a welcome gift to us all. In a nutshell, ESA is an open standard for adding communication capabilities to normally "dumb" components. Using USB as the basic protocol, ESA adds intelligence to devices such as water coolers, power supplies, and cases, so you'll have more insight into how your PC is running and be able to effect changes.

I finally kicked the tires on ESA's basic functionality with this month's Hypersonic Sonic Boom OCX (reviewed on page 68). The PC came with an ESA-enabled PC Power and Cooling 1,200 watt PSU and CoolIT Systems Freezone Elite. At this stage, the software, drivers, and hardware are pretty rudimentary, but I like what I saw.

Of course, your own appreciation of ESA depends on how geeky you are, but I like knowing that my PSU is eating about 34 amps on the 12-volt rail at idle. And just how hot is it inside my power supply? Well, it's 31 C, and the fan is spinning at 100 percent. Likewise, just what is the temperature of the coolant? You'll know if you have an ESA-enabled water-cooling system. Sure, some water-cooling rigs already give you basic readouts and manual control over flow, but ESA will eventually let you control functionality from the OS or monitor a device remotely across the Internet.

Ultimately, if ESA takes hold, we could use it to troubleshoot problems—we'd know if the power supply is overloaded or if the coolant is low. Cases with ESA will let you toggle lights and control fans from within the OS, functionality which has been limited to large OEMs until now, and I'm sure some crafty geek will figure out a way to let you remotely control a USB device via ESA, so your Peltier cup-cooler has your beer nice and cold by the time you get home from the cubicle.



ESA will finally let you know the actual load on your PSU!

ESA actually stands a better chance of widespread adoption than Nvidia's EPP profiles for RAM. While EPP couldn't make it past the August JEDEC memory council, ESA will be submitted to the USB-IF—the folks who approve USB standards. Nvidia is even willing to forgo branding the spec with its name to ensure its competitors feel more comfortable adopting it.

Overall, ESA is cool and will give power users yet another reason to upgrade.

Nathan Edwards

Flies the Friendly Skies

And pits Hypersonic's triple display against the reigning single-panel champ

In my review of the Hypersonic Sonic Boom OCX on page 68, I focused on the PC's performance and stability—crucial qualities in any gaming rig. But I'd be doing this machine a disservice if I didn't talk a bit about its flight-simulator setup.

Hypersonic shipped the Sonic Boom with three 19-inch monitors controlled by a Matrox TripleHead2Go Digital Edition—enabling a resolution of 3840x1024 across a single desktop—as well as Saitek's Pro Flight yoke and rudder pedals. The good news: Flight Simulator X looks fantastic with this panoramic view. But is it worth it? Are three relatively small monitors better than one huge one? For comparison, I also tested the Hypersonic with one 30-inch Gateway XHD3000 at 2560x1600.

The verdict? Although I and others here thought we'd prefer a large single-panel display, when it came to the flight sim, I actually preferred the smaller panels' wraparound effect, which felt more lifelike. Once I returned to the desktop for real work, however, the happy feelings vanished. The triple monitors are especially irksome when you have to go into the BIOS. Instead of being confined to one panel, the BIOS screen is stretched across all three, which makes changing settings rather difficult. It was hard to tell if I was adjusting the CPU core voltage or RAM voltage with the TripleHead2Go enabled.

Given the choice, I'd go for the triple-panel display for racing, flying, or any other immersive sim—maybe even an MMO. But for most other purposes, I'll take a single large panel any day.

How We Test

Real-world benchmarks. Real-world results

We use the following multithreaded apps to test a PC's performance relative to our zero-point test bed:

Adobe Premiere Pro CS3: We take HD video shot on a pro Sony camera and output the edited results to a Blu-ray-friendly MPEG-2 file format. This test favors clock speed and likes quad-core CPUs.
Adobe Photoshop CS3: A gazillion Photoshop filters are applied to a RAW digital-image format.
Photodex ProShow Producer: This pro-level photo slide-show application spits out a hi-def MPEG-2 file format and favors multicore CPUs.
Mainconcept Reference: We take an HD-resolution MPEG-2 file and convert it to H.264/AVC with this multithreaded encoder. Used by advanced amateurs and professionals, this encoder likes fast, efficient multicore procs.
FEAR: Our DX9 gaming test runs at 1600x1200 with soft shadows and is a good approximation of gaming performance for slightly older titles.
Quake 4: Based on the Doom 3 engine, this OpenGL shooter is optimized for dual-core CPUs, and although older, it still reveals weaknesses in OpenGL drivers.

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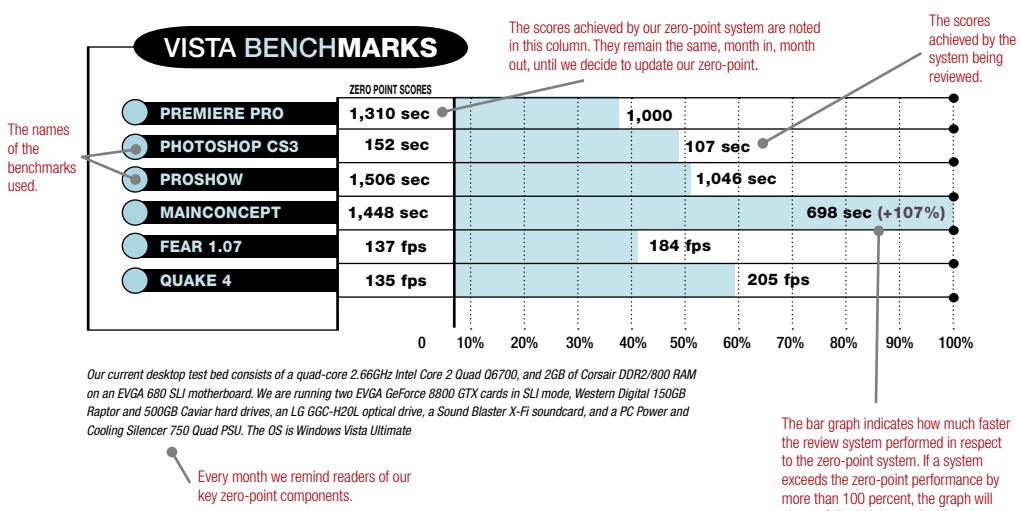
- Chumby
- Microsoft Wireless Entertainment Desktop 8000
- Corel Paint Shop Pro
- SilverStone SG03
- Samsung 940UX
- Gigabyte 3D Rocket
- Maxtor OneTouch 4 Mini
- SilverStone NT06

How to Read Our Benchmark Chart

Maximum PC's test beds double as zero-point systems, against which all review systems are compared. Here's how to read our benchmark chart.



Our current desktop test bed consists of a quad-core 2.66GHz Intel Core 2 Quad Q6700, and 2GB of Corsair DDR2/800 RAM on an EVGA 680 SLI motherboard. We are running two EVGA GeForce 8800 GTX cards in SLI mode, Western Digital 150GB Raptor and 500GB Caviar hard drives, an LG GGC-H20L optical drive, a Sound Blaster X-Fi soundcard, and a PC Power and Cooling Silencer 750 Quad PSU. The OS is Windows Vista Ultimate

Every month we remind readers of our key zero-point components.

The bar graph indicates how much faster the review system performed in respect to the zero-point system. If a system exceeds the zero-point performance by more than 100 percent, the graph will show a full-width bar and a plus sign.

BEST OF THE BEST

Our monthly category-by-category list of our favorite products. New products are in red.

High-end videocard
XFX GeForce 8800 Ultra

Midrange videocard
EVGA e-GeForce 8800GT SSC 512MB

Soundcard
Creative Labs X-Fi XtremeGamer Fatal1ty Pro Series

Hard drive
Seagate 1TB Barracuda 7200.11

External backup drive
Seagate Freestyle Pro 750GB

High-def burner
LG GGW-H20L

DVD burner
Samsung SH-203B

High-end LCD monitor
Gateway XHD3000

Budget LCD monitor
Samsung SyncMaster 206BW

Socket AM2 Athlon 64 mobo
Gigabyte GA-M59SLI-S5

Socket 775 Core 2 Duo mobo
Asus P5E3 Deluxe WiFi-AP@n

HD-based MP3 player
Apple iPod

Flash-based MP3 player
Toshiba Gigabeat MET-400

5.1 speakers
Gigaworks S750

2.0 speakers
Audioengine 5

Midtower case
Antec Nine Hundred

Full-tower case
Gigabyte 3D Mercury

Games we are playing
Unreal Tournament III, Crysis, Call of Duty 4: Modern Warfare, Team Fortress 2, Portal

Hypersonic Sonic Boom OCX

Little red Corvette, baby you're much too fast

Understated elegance: A killer paint job makes for a classy chassis.

January 2004. DirectX 9 had just shipped. SCO had begun its ultimately futile crusade against IBM. And Hypersonic's brightly colored Sonic Boom, featuring Intel's newest processor, was smacking our benchmarks around.

Sure, back in 2004 the new hotness was Intel's Pentium 4 Extreme Edition and the Sonic Boom's paint job was bright yellow, but the cherry-red Hypersonic Sonic Boom OXC—the first rig we've tested using Intel's fabled Penryn CPU—still gives us an undeniable sense of déjà vu.

This Sonic Boom's got a sweet 3GHz Core 2 Extreme QX9650 CPU overclocked to 3.88GHz on a 1.7GHz FSB. Throw in a pair of XFX GeForce 8800 Ultras and 4GB of OCZ Reaper DDR2 at 1,208MHz, all sitting pretty on Nvidia's new 780i SLI motherboard, and you've got a system as hot—in theory—as the Sonic Boom we awarded a 9 Kick Ass verdict to four years ago. Unfortunately, we don't traffic in theory. Despite hot parts, a fab paint job, and wicked technology, the Sonic Boom went bust during our stability testing.

It's a shame because one of the neatest things about this Hypersonic system is its use of Nvidia's new open Enthusiast System Architecture (ESA), which enables unprecedented monitoring of system temperatures, voltages, and stats via the Nvidia Monitor app. The 1,200-watt PC Power and Cooling Turbo Cool power supply is ESA-compliant, as is the custom CoolIt CPU/GPU cooler. You can read more about the ESA on page 60, but let's just say we like it.

Before we get to the nitty-gritty of benchmarking, let's marvel for a minute at Hypersonic's fully kitted flight simulator rig. The Lian-Li PC-A10 chassis is beautifully decked out with a cherry-red Colorware paint job, and looks sleek but still classy, especially compared to the over-the-top cases we've seen recently from HP, Dell, and AVADirect.

Hypersonic doesn't mess around when it comes to crafting a flight-sim deck. Instead of one measly monitor, we got three 19-inch LG L1933 Flatron displays hooked up to a Matrox TripleHead2Go Digital Edition, which runs the three digital monitors from one DVI port for a combined 3840x1024 resolution. You'll find our impressions of the flight-sim aspects of this setup, which also include a Saitek Pro Flight yoke, rudder pedals, and throttle, in this month's In the Lab (page 60).

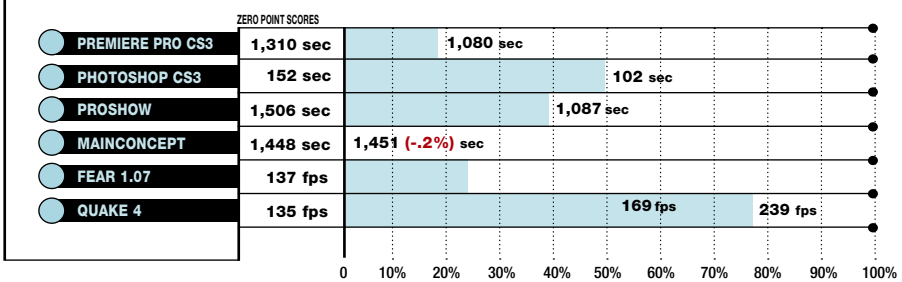
But what if flight simulation's not your thing? What if you're only interested in the rig itself and not the optional flight-sim package and all its accoutrements? It is for you, Earth-bound reader, that we ended our dreamy sky tours and commenced our standard Vista benchmark suite.

This duct hides an additional radiator next to the power supply.

UNDER THE HOOD

BRAINS	
CPU	Intel Core 2 Extreme QX9650 (3.0GHz overclocked to 3.88GHz)
MOBO	Nvidia 780i SLI
RAM	4GB OCZ Reaper DDR2/1208
LAN	Gigabit LAN x2
HARD DRIVES	Two 150GB Raptors (10,000rpm SATA) in RAID 0; 1 1TB Hitachi DeskStar backup drive
OPTICAL	Plextor PX-810SA
BEAUTY	
VIDEOCARD	Two 768MB XFX GeForce 8800 Ultras in SLI
SOUNDCARD	Realtek HD (onboard)
CASE	Lian-Li PC-A10
BOOT: 52 sec.	DOWN: 31 sec.

VISTA BENCHMARKS



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The Enthusiast System Architecture enables the power supply, cooling system, and motherboard to talk to each other.

This is the second rig we've tested using our new benchmarks and for the most part it performed admirably. The rig's best scores came in Photoshop CS3, which at 102 seconds was nearly 50 percent faster than our zero-point, and Quake 4, where we saw our fastest frame rates ever: 239 fps, which not only devastated the zero-point (135 fps) but also bested the Falcon Northwest rig (226 fps) that has held the record since June. Vista gaming is finally catching up to XP!

We found decent gains in our ProShow Producer, Premiere Pro CS3, and Fear 1.07 benchmarks as well. In fact, the only benchmark in which the Sonic Boom OCX had any trouble at all was our MainConcept encoder test, where it had plenty. It locked up in two out of three runs. When it finally completed a test, its score was a disappointing 1,451 seconds—slower than our zero-point system.

The system didn't fare well in our Prime95 stress testing, either. One core usually failed less than an hour into the tests, and it wasn't until we set all clock speeds back to stock that we saw any real long-term stability. Granted, a stress test is the ultimate machine punisher, especially on a machine as overclocked as this one, but like many other vendors recently, Hypersonic went a few megahertz too far.

Hypersonic sent us a system that looked great and performed pretty damn well on our benchmarks. We appreciated the massive overclocks, forward-thinking Penryn, ESA architecture, and flight-simulator setup, as well as the overall build quality. But stability issues hurt this machine, as does its volume—the fans are simply too loud. We understand that Hypersonic, freshly acquired by OCZ, may still be adjusting to its new environment; hopefully, this is simply an aberration, and the next rig we see from the company will be firmly back in 9 Kick Ass territory. But nearly $8,000 for a loud machine that crashes occasionally just doesn't meet our expectations.

—NATHAN EDWARDS

HYPERSONIC SONIC BOOM OCX

HYPERION

Penryn, ESA, dual 8800 Ultras, sensible storage, beautiful paint job, killer accessories…

HYPERBOLE

…but it's clocked too fast for its own good, and it's noisy.

6

$7,800 w/monitors and flight sim setup; $6,600 w/out, www.hypersonic-pc.com

AMD Radeon HD 3850

One step forward, one step back

We were so pleased with the price/performance ratio of AMD's Radeon HD 3870 that we awarded Asus's implementation of it a 9 Kick Ass verdict in our January 2008 issue. We're not nearly as impressed with the gaming performance of the architecture's cheaper cousin, the Radeon HD 3850.

The two GPUs share many features, including the same number of stream processors (320), the same 256-bit memory interface, and AMD's Unified Video Decoder (for offloading all HD-video decoding from the host CPU). Both parts also provide HDCP support on both DVI links, so Blu-ray and HD DVD movies can be displayed on a 30-inch panel at the screen's native resolution.

On paper, the Radeon HD 3850 looks remarkably similar to the Radeon HD 3870, but key differences in clock speeds and memory render the former a tortoise and the latter a hare.

BENCHMARKS

WINDOWS XP (DIRECTX 9)	AMD RADEON HD 3850	GEFORCE 8800 GT
3DMARK06 GAME 1 (FPS)	14.4	**30.0**
3DMARK06 GAME 2 (FPS)	16.7	**22.9**
WORLD IN CONFLICT (FPS)	14.0	**32.0**
LOST PLANET (FPS)	16.2	**34.3**
WINDOWS VISTA (DIRECTX 10)	**AMD RADEON HD 3850**	**GEFORCE 8800 GT**
3DMARK06 GAME 1 (FPS)	15.6	**28.0**
3DMARK06 GAME 2 (FPS)	16.4	**22.3**
WORLD IN CONFLICT (FPS)	7.0	**20.0**
LOST PLANET (FPS)	12.0	**22.0**

Best scores are bolded. AMD-based cards tested with an Intel D975BX2 motherboard; Nvidia-based cards tested with an EVGA 680i SLI motherboard. Intel 2.93GHz Core 2 Extreme X6800 CPUs and 2GB of Corsair DDR RAM used in both scenarios. Benchmarks performed at 1920x1200 resolution on ViewSonic VP2330wb monitors.

And like the 3870, the cheaper 3850 supports PCI Express 2.0, Direct3D 10.1, and Shader Model 4.0 (none of Nvidia's GPUs support the latter two features, although it will be a long time before this advantage really means anything). But while the 3870 reference design features 512MB of GDDR4 memory and a dual-slot cooler, the 3850 board we received was outfitted with just 256MB of GDDR3 memory, a single-slot cooler and relatively tame core, and memory clock speeds of 670MHz and 829MHz, respectively.

For gaming, the Radeon HD 3870 was at least competitive with Nvidia's 8800 GT, but the Radeon HD 3850 is a laggard when it comes to gaming at the native resolution of a 24-inch screen (1920x1200). The frame rates we achieved were roughly half of what we obtained with the 8800 GT. If the 3850 cost half as much as an 8800 GT (average street price: $260), this card would garner a Kick Ass award, but at press time, the average street price for these boards was $190. The extra $70 not only buys a faster GPU, but a frame buffer that's twice as large.

If gaming isn't your bag, the Radeon 3850 is a fine GPU for watching high-definition movies. But we prefer videocards that can do it all.

AMD RADEON HD 3850 **7**

—MICHAEL BROWN $190, www.amd.com

HP MediaSmart EX475

This is one sassy little server

We're going to get this out of the way up front. If you're looking for raw speed, the MediaSmart isn't for you. We've tested faster NAS boxes, but we've never tested a network storage device that delivers the same level of functionality as this little Windows Home Server-based wonder.

The svelte hardware looks more at home on your bookshelf than a server rack, and it's virtually silent. Based on its hardware specs, the EX475 appears to be either a supercharged NAS box or an underpowered server. With a 1.8GHz single-core Sempron processor, 512MB of RAM, and two 512GB drives, it straddles the server/NAS box line. We wouldn't have minded seeing larger drives, but with two free tool-less drive bays, adding more storage takes seconds. This rig isn't about hardware but rather the delicious software inside.

HP's MediaSmart includes four tool-less drive bays and an eSATA port. Adding more storage takes mere seconds!

BENCHMARKS

	MEDIASMART EX475	HOMEBREW HOME SERVER
WRITE TEST		
LARGE FILE (SEC)	151	**88**
SMALL FILES (SEC)	99	**67**
READ TEST		
LARGE FILE (SEC)	354	**158**
SMALL FILES (SEC)	**156**	159
POWER USAGE (WATTS)	220	**82**

Best scores are bolded. The homebrew server is an Athlon X2 4800+ with 2GB of memory and 2 Hitachi E7K500 hard drives.

HP started with the basic Home Server package (reviewed January 2008). With automatic system backups, centralized music/photo/video sharing, and the ability to share your files remotely, Home Server is a win. But HP took the experience a step further, including an iTunes server along with a fully featured photo-sharing suite. When you factor in these new changes with the handful of eminently useful plugins available, you've got an extremely powerful device that could serve multiple uses inside any home.

We'd hoped to see slightly better performance from the MediaSmart, but given its low price, we're willing to make some allowances. Compared to a standalone Home Server rig sporting an Athlon X2 4800 CPU with 2GB of RAM, the MediaSmart took almost twice as long to complete large file transfers. The small-file transfer test took 32 seconds longer. Of course, the lower-powered MediaSmart draws less power every month than our full-size box. You have to decide whether speed or power is more important to you.

HP MEDIASMART **9**

—WILL SMITH $750, www.hp.com

Logitech G51 Surround Sound Speakers

Yes, you can have 5.1 on a budget

We're consistently amazed by how companies such as Logitech can jam so many features into a set of speakers that sell for $200. And Logitech's new G51 system is a good value if $200 is the absolute top of your budget and you must have a 5.1-channel system.

Some great new games with awesome positional audio are now available—BioShock being just one example—so we understand why many people will sacrifice audio fidelity in order to afford inexpensive surround-sound speakers like these. BioShock is a blast, and it's even better in surround sound. But with games, your attention isn't focused entirely on the audio. Listen to CDs on the G51s and you'll immediately hear the speakers' flaws. The subwoofer pushed a good amount of tight bass on Paul Thorn's "That Ain't Nothin' but the Devil," for instance, but the jangling sitar on "Sister Ruby's House of Prayer" (both from *Mission Temple Fireworks Stand*) struck us as listless and drab.

We dig case mods, so we applaud Logitech for providing a means of decorating these speakers. You wrap paper cutouts, which you can download or design yourself, around the shell of the satellite speakers to give them a custom look. Logitech also came up with a brilliant solution to the problem of where to put the center channel: You can either set it on top of your desk or clamp it to the top of your flat-screen monitor.

But if Logitech insists on hardwiring the speaker cable to the satellites, it needs to provide enough cable to reach the subwoofer: Five feet doesn't cut it—we had to place the sub between our feet in order to situate the front satellites on either side of our desk. The 9-foot cables for the surround channels, on the other hand, were plenty long.

Logitech's innovative G51 speakers are almost cheap enough for us to forgive their sonic shortcomings.

We haven't heard a better 5.1-channel system in this price range—and we're happy that Logitech resisted the temptation to route audio over USB—but if music is your top priority, there are plenty of better-sounding 2.1 and 2.0 rigs to be had.

—MICHAEL BROWN

LOGITECH G51 **7**

$200, www.logitech.com

Buffalo TeraStation Live

This slow-moving bovid can't keep up with the pack

Our hearts were ablaze with excitement when we busted open the chunky Buffalo TeraStation Live. And with good reason: On paper, the four-drive NAS device looked like it was going to be an easy winner—its two terabytes of total storage in a RAID-5 configuration made us smile.

As it turns out, we celebrated prematurely. The Buffalo TeraStation Live performs about as well in a file-transfer test as it would in a foot race. Surprisingly, it had slower read times than write times. At 5:16 (min:sec) to transfer a 3GB file from the NAS to a PC, you'll be in for a bit of a wait should you decide to use this device as a media hub.

Write speeds were marginally better but still not fast enough to catapult the TeraStation Live ahead of its competition. That said, the TeraStation Live offsets the pain by packing a few neat features into this otherwise plain-Jane device. We love the TeraStation's user-management settings—a handy web interface makes it easy to add new users, assign users to groups, and control file-access operations.

Also handy is the TeraStation Live's built-in media-server feature. We were able to pull up a shared batch of MP3s on iTunes with no problems whatsoever. While these features are nice, they don't distance the TeraStation Live from its competitors, and its slow transfer speeds further reduce its allure. We'd recommend the TeraStation Live for its data redundancy and ease of use, but like this device, we simply run out of steam for further praise.

—DAVID MURPHY

The enormous TeraStation Live should be called a network-attached bunker. It's a veritable subwoofer of storage!

BUFFALO TERASTATION LIVE **7**

$1,300, www.buffalotech.com

BENCHMARKS

	BUFFALO TERASTATION LIVE	QNAP TS-109 PRO*
READ		
SMALL (MIN:SEC)	1:20	**0:36**
LARGE (MIN:SEC)	5:16	**2:27**
WRITE		
SMALL (MIN:SEC)	1:05	**0:39**
LARGE (MIN:SEC)	3:50	**2:44**

*Best scores are bolded. We used the contents of Maximum PC's November 2007 CD for the small-file testing and a single 3GB file for large-file testing. All scores are averages of three transfer trials. *Scores for this enclosure were obtained using a provided 750GB Seagate 7200.10 Barracuda drive.*

Sony BWU-200S

The hours we spent testing this Blu-ray burner hardly seem worth it

As far as we're concerned, the Blu-ray burner to beat these days is LG's GGW-H20L1 (reviewed December 2007). Unfortunately for Sony, its BWU-200S isn't the drive to do it. We pretty much knew this before we even began testing the drive—after all, the BWU-200S is rated for 4x Blu-ray write speeds compared to the LG's 6x speed rating.

And true to form, LG's drive trounced Sony's in every Blu-ray burning scenario. What surprised us was how much slower the BWU-200S was compared to even its 2x predecessor, the BWU-100A that we reviewed in April 2007. Using the latest version of Nero CD-DVD Speed to test burn times, as we always do, the BWU-200S took a glacially slow 99:47 (min:sec) to fill a single-layer BD-R disc. That's almost an hour and 40 minutes to write 22.5GB of data! Its 2x forebearer took less than half that time.

BENCHMARKS

	LG GGW-H20LI	SONY BWU-200S	SONY BWU-100A
DVD WRITE SPEED AVERAGE	**12.09x**	11.23x	6.78x
DVD READ SPEED AVERAGE	9.24x	**11.73x**	6.17x
ACCESS TIME (RANDOM/FULL)	**99ms/192ms**	155/305ms	130/317ms
CPU UTILIZATION (8X)	**23%**	31%	34%
TIME TO BURN 22.5GB TO BD-R (MIN:SEC)	**21:23**	99:47	42:19
TIME TO BURN 22.5GB TO BD-RE (MIN:SEC)	**39:38**	97:52	93:13

Best scores are bolded. All tests were conducted using the latest version of Nero CD-DVD Speed and Verbatim media (except where noted). Our test bed is a Windows XP SP2 machine using a 2.66GHz Intel Core 2 Quad Q6700, 2GB of Corsair DDR2/800 RAM on an EVGA 680 SLI motherboard, one EVGA GeForce 8800 GTS card, a Western Digital 500GB Caviar hard drive, and a PC Power and Cooling Turbo Cool PSU.

There are some good things to Sony's BWU-200S, such as its SATA interface and handsome faceplate.

Repeated tests with rewriteable and double-layer Blu-ray media produced similarly abysmal results. What gives?

A call to Sony provided the answer. By default, the BWU-200S's defect-management routine is enabled for Blu-ray media. So every block of data written to a BD disc is simultaneously checked for errors, doubling burn times. The feature can be disabled, but only in the bundled Power2Go burning app—part of the CyberLink suite that is included with the drive. Once we did that, the BWU-200S's burn times were more reasonable—45:38 to fill a single-layer BD-R, 45:17 to fill a single-layer rewriteable disc, and 91:13 for double-layer media—but these times still aren't as good as those of other 4x drives we've tested (and we haven't tested any other drive that performed better with BD-RE than BD-R!). The most impressive result came from burning 45.2GB of data to Sony's prerelease 4x BD-R DL media. Burn times were literally cut in half when compared to burning to a 2x disc. We're looking forward to using the faster media with a really good drive, like LG's GGW-H20L1.

—KATHERINE STEVENSON

SONY BWU-200S **6**

$600, www.sony.com

Koolance PC4-1025BK

Awesome cooling alone does not an awesome case make

Sweet mercy, at first glance Koolance's PC4-1025BK case seems like a perfect power-user box. Unfortunately, this water-cooling-enriched case is simply too small to contain certain enthusiast hardware and too complicated for the average user.

The case integrates a water-cooling mechanism directly into the chassis—Koolance's KIT-1000KB cooler, a tri-fan setup that comes with a front-mounted controller mechanism for auto-adjusting the fans' speeds. The whole getup is a tidy little package that cools monstrous amounts even when using the quietest mode the PC4-1025BK offers.

But impressive benchmark scores do little to alleviate our utter contempt for the design and building process that accompanies the PC4-1025KB, an experience wholly unlike what one encounters with the similarly outfitted Gigabyte Mercury Pro (January 2007).

Building a functioning machine in the case is nightmarishly complicated. You have to assemble the CPU water block yourself, attach the tubing, and somehow wedge a motherboard and high-end components upside-down amidst these plastic modified tentacles. A 7.1-inch-long power supply doesn't even fit in this Lian-Li case—unless you remove a drive bay. An Nvidia 8800 GTX barely fits in the case as well.

BENCHMARKS

	STOCK COOLER	KOOLANCE PC4-1025BK (LOW)	KOOLANCE PC4-1025BK (HIGH)
IDLE (C)	38.6	25.4	**23.5**
100% LOAD (C)	71.4	42.1	**37.3**

Best scores are bolded. Idle temperatures measured after an hour of inactivity; load temperatures measured after an hour of CPU Burn-In (four instances). Test system is a stock-clock QX6700 processor on an EVGA 680i mobo with an Nvidia 8800 GTX graphics card

Koolance's PC4-1025BK is cluttered before any components are installed. We had to remove part of the reservoir just to fit in our parts.

It doesn't help that Koolance neglects to include a manual for the case itself. You get a manual detailing everything you need to know about the accompanying water-cooling mechanism, but no guidance on how to set up anything else in the case. True power users may never refer to a manual, but it'd be nice to have a reference during the installation process.

Midtower cases might work for some high-end rigs, but the PC4-1025BK proves that an antiquated design plus tons of tubing spells disaster.

—DAVID MURPHY

KOOLANCE PC4-1025BK **5**

$555, www.koolance.com

Microsoft Zune 8GB

Who says there are no second chances?

If you buy a Zune, skip this model and scrounge up the extra $50 for the 80GB hard-drive model instead.

Microsoft, seeing the futility in polishing turds, went back to the drawing board to design the second rev of the Zune. (If only they'd do the same for Vista!) Fortunately for early adopters, many of the new features and desktop software will be made available for the first-gen Zune via a firmware update.

The new player features a much-improved control mechanism consisting of a touch-sensitive pad atop four buttons. You can navigate menus by either dragging your thumb up and down (or back and forth, depending on the screen's current orientation) or pushing down on the pad to depress the buttons. Depressing the center of the pad selects whatever menu item is highlighted. If you don't like the touchpad, you can turn this feature off and rely solely on the buttons.

The Zune's wireless features have undergone significant improvements, including the ability to manually sync your Zune to your PC when in range of a wireless network (the Zune must be connected to an optional AC adapter or charging dock to sync automatically). The much-touted but virtually useless wireless song-sharing feature remains just as useless, but at least the three-day play-it-or-lose-it limitation has been eliminated (the recipient, however, remains limited to three plays).

The Zune Marketplace has also undergone a much-needed retooling, adding podcast support, one million DRM-free MP3s, and a $15-per-month all-you-can-eat subscription model called Zune Pass. This compensates for the fact that the hardware ties you exclusively to Microsoft's service (there's no support for Rhapsody or other subscription services). The notion of buying music with points instead of dollars and cents (which you, of course, use to buy points in order to buy music), on the other hand, still leaves us cold.

The Zune 8GB sounds every bit as good as the first Zune, and Microsoft has added support for tracks encoded in WMA Lossless. The 1.8-inch glass screen looks very sharp, but it's also very small—especially when you're watching videos—and the flash player can't be connected to your TV (both new and previous hard-drive models do support this feature).

—MICHAEL BROWN

MICROSOFT ZUNE 8GB **8**

$200, www.zune.net

Portable Drive Paso Doble

Two drives tango to fulfill our on-the-go storage desires

It's USB day here in the storage review section of *Maximum PC*. Both of the enclosures we're testing this month are light on connection opportunities, but they more than make up for it with speedy data transfers!

—DAVID MURPHY

The ultra-lightweight Passport is beautiful, and almost rivals the portability of a USB key—almost.

We would trade an arm, if not a leg as well, for a terabyte model in the OneTouch line.

WESTERN DIGITAL PASSPORT

Pink is our new obsession, and we have Western Digital to blame. Its pink, portable Passport hard drive (try saying that fast) is small enough to fit in Steven Tyler's mouth, yet it comes with two of our most favorite features in the world: sweet speeds and snazzy backup software. And to top it off, you have to carry only a single USB cable alongside the little sweetheart, as there's no accompanying power brick or annoying connector.

You get a crisp 250GB of storage with the pink Passport drive; accompanying programs soak up 60MB of that space. We have no objection to this, save for Western Digital's continued insistence on bundling Google spam alongside every external hard drive it sells. At least the autorun/installer application is less intrusive about slapping a toolbar, desktop search, and Picasa on your machine than previous Western Digital products—you can now choose whether to install those items.

The Passport is one of the speediest portable hard drives in the size-of-your-hand category, pulling in a wonderful 34.7MB/s average read speed during our synthetic HD Tach benchmark test. OWC's 160GB, 7,200RPM Mercury On-the-Go (reviewed August 2007) just overtakes the Passport's average read speed by 1MB/s; the OWC device loses the overall matchup, however, by being 90GB smaller and costing $50 more.

Included with the Passport is the ever-awesome WD Sync software. It's a staple of Western Digital's portable drive line, and it's easy to see why—the synchronized backup is simple and clutter-free, and the fully functioning mobile Outlook client turns our cheeks pink with delight.

WESTERN DIGITAL PASSPORT

TRAIN KEPT A-ROLLIN'
It's fast, it's light, it requires only one cord!

DROPS OF JUPITER
Google advertising/software is unnecessary; the black 320GB variant is only $20 more.

8

$200, www.wdc.com

MAXTOR ONETOUCH 4

We were about to lead off this review with a Nelson Muntz-style "ha-ha" at Seagate, whose 750GB FreeAgent Pro (**http://tinyurl.com/28y9dg**) has now fallen from the top of our external storage rankings thanks to Maxtor's OneTouch 4. And then we remembered that Seagate now owns Maxtor. Whoops.

The OneTouch 4 is easily the fastest non-RAID, USB-based external device we've tested. That's a lot of modifiers, but we don't want to give credit where it isn't due. Yes, there are bigger enclosures—Western Digital has terabyte-size external storage devices. And, yes, there are enclosures with more than just a USB connection—just look at Seagate's own FreeAgent Pro.

But if you don't have eSATA or FireWire, the OneTouch 4 represents the pinnacle of speedy portable storage. The device comes with included backup software that sucks up nearly 60MB of space on the drive, but it's space well utilized—the software lets you perform backups and synchronizations in a very unobtrusive manner.

A few design flaws—like the absence of a power switch–keep the OneTouch 4 out of the Storage Hall of Fame, but while we can critique the nitty-gritty, we can't overlook the speed or software. Coupled together, they make for a great storage device.

MAXTOR ONETOUCH 4

KANG
One of the fastest USB-connected devices we've tested; quiet as a dead mouse.

KODOS
No other connection options, save for USB; no power switch.

9

$270, www.maxtorsolutions.com

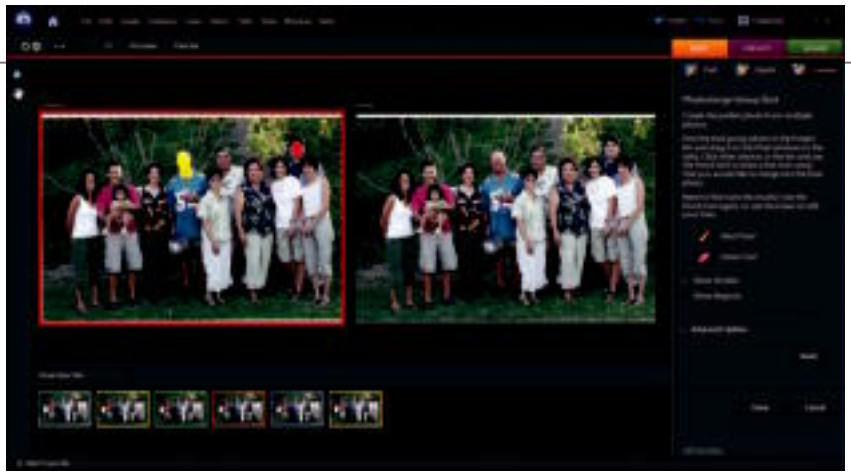
BENCHMARKS

	WESTERN DIGITAL PASSPORT	MAXTOR SEAGATE ONETOUCH 4	FREEAGENT PRO (USB)
BURST (MB/s)	36.2	**37.5**	26.3
RANDOM ACCESS (MS)	17.5	**14.1**	21.5
AVERAGE READ (MB/s)	34.7	**37.2**	25.5

Best scores are bolded in each connection category. All benchmarks taken using HD Tach 3.0.4.0.

Adobe Photoshop Elements 6 and Premiere Elements 4

One of the Elements kids needs to repeat a grade



Photoshop Elements 6's Group Merge function will make family gatherings happier.

We've closely watched the Elements kids since their birth, and though we've generally been pleased with their development, we're a bit concerned about Adobe Premiere's and Photoshop's offspring. While Photoshop Elements 6 continues to impress us and we're sure she's on her way to an Ivy League school and a happy life as a doctor, Premiere Elements has us worried.

First, the good news. Photoshop Elements is a darling. Now fully matured, she's able to pull off some truly useful tasks, including merging a handful of bad group photos into one good photo simply by selecting a base image. You then pick and choose faces from other photos and Elements merges them into one perfect group photo. The new Quick Selection tool allows you to choose sections of an image based on nearby colors, so you can easily change the color of an object without having to use other selection tools.

Not all the new features are practical though. One new trick, the ability to merge portrait photos, lets you do such useful things as blend the eyebrows from mom and the mullet from dad onto another person's image. While neat to play around with, you're unlikely to actually use this feature more than once.

Many of Photoshop Elements's other enhancements come in the organization and sharing department. While good for anal-retentive types, color us unimpressed because they don't help those who already have huge photo libraries.

But enough about that overachiever. Premiere Elements, which we gushed about at version 2, hasn't developed as quickly as his sibling. When he turned 3, he couldn't display HDV content while it was being captured. He also couldn't detect scenes when capturing high-def content. Now turning 4, Premiere Elements can finally display HDV content and detect scenes, but he doesn't understand the AVCHD format—something other kids in his grade can do.

Premiere Elements, once quick on his feet, feels sluggish even on modern hardware. Also annoying: Video previews are disturbingly pixelated. Adobe says it's the side effect of an "improvement" it made to its video-scaling algorithms. "Unfortunately, these algorithm changes unintentionally affected the preview resolution, which appears different when a clip or photo has a different resolution than the project resolution. Users can work around this issue by first rendering the clips that have a different resolution from the project," explained an Adobe spokesperson. The upshot is that previews are unacceptably bad.

Subpar performance and low-resolution previews make Premiere Elements 4.0 a disappointing update.

We also had issues creating still-image slide shows—they looked choppy. But it was actually that little do-gooder Photoshop Elements's fault. One of Premiere's recommended newbie ways to create a slide show is with the photo organizer in Photoshop Elements. Unfortunately, the tool is crap. We achieved more satisfactory slide shows using Premiere Elements's native (albeit far more complicated) still-image support.

Not everything is bad here. Elements does have some niceties, such as top-notch titling and better online file-sharing capabilities—and that freeze-frame button is still handy. The stock title menus and art are also superior to that of other products. The interface is also tweaked to be friendlier to newbs, with easier access to guides that walk you through tasks and improved media catalog management.

As a pair, Photoshop Elements carries the water for the underperforming Premiere Elements. As a stand-alone product, Photoshop Elements 6 would garner a 9 verdict, but being bundled with Premiere weighs the package down.

—GORDON MAH UNG

ADOBE ELEMENTS 6.0 & PREMIERE 4.0

KIRK DOUGLAS

Elements 6.0 adds useful tools that take the work out of image editing.

7

MICHAEL DOUGLAS

Elements 4.0 continues to disappoint with problems such as ultra-low-resolution video previews.

$150, www.adobe.com

Hellgate: London

Smile! You're in hell!

Have fun killing the same things in Act 5 that you were killing in Act 1; Hellgate doesn't offer much demonic diversity.

Hellgate: London wishes it were a lot of things: Diablo III, an MMO, and fun, to name a few. However, the game is as related to Blizzard's epic series as a soiled napkin is to the *New Yorker*. Hellgate isn't an MMO either; Flagship Studios would love to upcharge you $10 a month for additional content (which is limited to a meager number of quests and items, as well as guild support and increased inventory space), but Hellgate's core mechanics aren't even on par with those of games that lack a monthly fee, such as Guild Wars.

Even if we leave its uncanny resemblance to Diablo out of the equation—which hardly seems fair, given that Hellgate's predecessor is in many ways better—we've been given an experience that feels rushed in every way. Abandon all hope ye who choose to take on this quest.

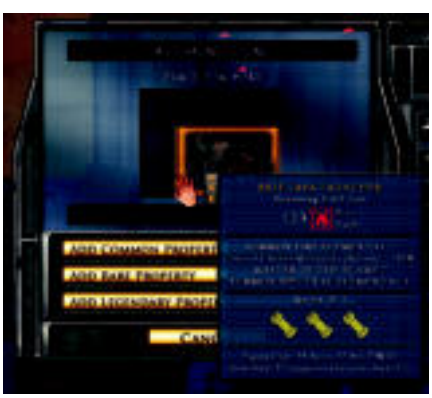
We'd normally use this paragraph to offer up some witty retelling of Hellgate's plot, but the game fails to tell a cohesive story. The inside jokes and witticisms just aren't funny, and they take up a majority of the NPCs' spoken or typed text. They give Hellgate an amateur-hour feel, and it's a shame that the game's irritating dialogue system doesn't help matters at all. Rather than getting all the text at once, or even a hefty paragraph, you must click "Next" to reward yourself with the next line of prose.

Luckily, since most of the quests are of the FedEx variety, you can simply skip the game's dialogue without missing any details. Just know that for all the times you enter an instance to kill multiple iterations of the same demon, you're doing something good. And somehow, these acts of heroism all build up to what one might call an ending, were there a discernable plot in Hellgate worth resolving.

To its credit, Flagship's developers make the quests a bit more technically interesting as you get closer to the endgame. For example, watching hordes of NPC characters clear out the baddies on a level is a moment worth relishing, given that you've just spent four acts killing the same zombies left and right. But there's nothing more infuriating than seeing said legions of NPCs slaying quest-specific monsters and giving you no credit for the kill. The solution? You're forced to either run through the level like a madman, hoping to hell that the train of baddies behind you can't kill you before you find your eight kills—or jump in and out of the instance in an attempt to reset the level's enemies.

It's a wonderful moment when Hellgate rewards your progress by letting you sit back and stop playing the game. While this was surely intended as a way to develop the plot, we consider it an act of charity for such a miserable bloody romp through London.

—DAVID MURPHY



You can upgrade your favorite weapons, but Flagship killed this feature by limiting the number of times you can make changes.

Hellgate's bonus levels—random entryways scattered throughout the map—are well worth skipping; you're better off using the time to grind.

HELLGATE: LONDON

FROM HELL
It's the closest you're going to get to a first-person Diablo.

EVENT HORIZON
Poor inventory trading mechanism; server glitches force you to restart from your last save.

5

$50, www.hellgatelondon.com
ESRB: M

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phone number; no fewer than three high-res JPEGs (minimum size 1024x7
and a 300-word description of what your PC represents and how it was modified. Emailed submissions should be sent to **rig@maximumpc.com**. Snail mail submissions should be sent to Rig of the Month, c/o Maximum PC, 4000 Shoreline Court, Suite 400, South San Fran

The judges will be *Maximum PC* editors, and they will base their decisio
creativity and craftsmanship.

ONE ENTRY PER HOUSEHOLD. Your conte
(1) six months after its submission or (2) February 1, 2007, whichever date
winner will be chosen from the existing pool of valid entries, and featured
department of the magazine. The final winner in this contest will be announced in the April 2007 issue. Each of the judging criteria (creativity and craftsmanship) will be we
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guardians. Future US, Inc. is not responsible for damages or expenses that
a result of the Contest or the receipt of a prize, and winners are responsibl
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addressed envelope to Future US, Inc. c/o Maximum PC Rig of the Month,
400, South San Francisco, CA 94080. This contest is limited to residents o
purchase necessary; void in Arizona, Maryland, Vermont, Puerto Rico, and

We tackle tough reader questions on...

✓What Vista Does Right ✓Overclocking ✓Windows Home Server

THIS ISN'T A VISTA PROBLEM WE'VE EXPERIENCED

Thank you for your exceptional coverage of the computer-gaming industry. I have a question about Microsoft Vista with respect to its compatibility with Windows XP Pro with SP2. I have read that the two are not compatible and will have problems if I try to upgrade to Vista Ultra. Is this true? If so, what can be done about it?

—Michael J. Hussey

ASSOCIATE EDITOR DAVID MURPHY RESPONDS: Vista is fully compatible with Windows XP Professional (SP2) in the sense that you mean: You can upgrade your OS to Vista, replacing your original XP Professional installation. You can wipe your original OS and install Vista in the empty space. You can even set up a second drive partition through Windows XP and install Vista on it for a best-of-both-worlds, dual-booting system.

We're still not particularly impressed with Vista, but we can't slam it for something it's quite capable of.

YOUR MILEAGE MAY VARY

I have been an overclocker for many years, dating back to the Commodore 128. The warranty on my Athlon 4200+ expired, and my curiosity got the best of me. I just wanted to see how far this thing could overclock.

My setup consists of the processor with a stock heatsink and fan, 1GB of DDR RAM, a Radeon 1650 Pro, and an MSI mobo. I have two fans pulling air in and one exhaust fan. I've overclocked the 4200+ from its stock speed of 2.1GHz all the way to 2.7GHz. At idle, the temps seem OK—running in the high 30s under normal load. Then I decided to benchmark it with 3DMark05 to see what would happen to the temps. The system reached only 49 C after 20 minutes of this benchmarking. My question is, are all of the overheating problems you describe in the magazine a result of cramming too much stuff into a midtower case?

—Dick Gray

SENIOR EDITOR GORDON MAH UNG RESPONDS: The overclocking we conducted for "Overclock Your PC" (January 2008) was done on a rig without a case and with multiple fans blowing over the system. As noted in the story, we overclocked an Athlon 64 X2 3200+ Brisbane dual-core CPU and achieved speeds similar to yours. The 2.2GHz proc got to 2.73GHz before things got ugly. Problems with the top-end X2 6000+ and X2 6400+ processors are due to excess heat caused by the voltage being poured into the core to get the frequencies up—that old 90nm process just isn't built for it.

LOGO DISSATISFACTION

*I have been reading **Maximum PC** for nearly six years now and it's great. However, I am writing to request that you differentiate between the Geek Tested & Approved and Disapproved logos a little more in your QuickStart section. Currently, it is difficult to quickly discern the results of your short review.*

—Bryan Parry

EDITOR IN CHIEF WILL SMITH RESPONDS: Great idea, Bryan! Next time we run a Geek Tested and Disapproved Product you can look forward to seeing a new, even more disapprove-ier logo.

MESHING UP THE INTERWEB

*What do you think of the mesh wireless networking hardware from Meraki, **http://meraki.com/**. Is this a practical solution for extending Wi-Fi for home networks.*

—BL Chu

EXECUTIVE EDITOR MICHAEL BROWN RESPONDS: Meraki demoed its product for me a while back, but I've been waiting for the company to ship its solar-based system before I review the package. I think these devices have a lot of promise, but I can't speak from personal experience just yet. I thought the solar product was just around the corner, but I've been waiting for it since August. I have a tall pile of other

Even Robots Love Maximum PC

*For the last six months, I have been deployed to Iraq, where I have been shot at, blown up, and slept in some conditions that a hobo would consider crude, and every month I had a new **Maximum PC** to look forward to. My fiancee would forward my "tech porno" to me, so I could have some enjoyment while roasting in hell. I'm enlisted in the Air Force but because of my job, I have been attached to an Army unit at an FOB (Forward Operating Base). I work as an EOD technician, basically the bomb squad, so my services are in demand, and we operate often. The next issue I read will be in the comfort of my own home because in a few more days, I'll be flying home, taking my magazines with me. Thanks for the little slice of home each month.*

—SrA Michael Newton
USAF AD EOD

CUTCOPYPASTE

A story in the December issue of *Maximum PC* incorrectly stated AMD has a 45nm fab line in Shanghai instead of reporting that AMD's next CPU is code-named Shanghai.

products I need to review first, so if the solar devices don't show up before I reach the bottom of the pile, I'll review Meraki's product as it stands.

WE'LL SKIP THE OBVIOUS JOKE, ALAN

I look to your mag for all the latest and greatest info, and this year's Tech Preview (Holiday 2007) was no exception. I found something that I fell in love with: Windows Home Server. I'm just wondering what version of DirectX Home Server will use? Will it sport DX9, or will Microsoft have the brains to offer DX10 and make this a must-have for all power users wanting DX10 without the turtle speeds of Vista?

—Alan S. Parsons Sr.

EDITOR IN CHIEF WILL SMITH RESPONDS: As much as I like the Home Server OS, I wouldn't recommend it for day-to-day desktop use. It's based on Windows Server 2003, and thus lacks many of the practical features that desktop users require. In fact, because it's a server OS, there aren't drivers for many common pieces of hardware—including ATI graphics cards. Instead of using it on your desktop, we recommend that Home Server be used for a machine that you stick in a closet, sans keyboard, mouse, and monitor, to quietly serve your media files throughout your home.

In the meantime, if you want to run DirectX 10, you're stuck with Vista.

THANKS, BILLY!

*Kudos to the **Maximum PC** staff for taking the magazine issues off the shelf and straight into PDF format. This is something I have wanted for years, and it is of no obvious monetary gain to you (they don't even have advertisements in them). I've kept every issue of the magazine since its inception, and now I don't have to find another place in my crowded house to store them. I'm not a collector, per se, but to be able to retain years of computer history in your magazine in digital format allows me to feel I have a wealth of knowledge without the waste of storage space.*

*The only thing I wish is that you would provide the PDFs all the way back to the first **boot** issue. I've still got those magazines, and I don't want to lose such an intriguing look at the history of computers. Thanks again for offering these to the public and keep up the good work.*

—Billy Turnbow

EDITOR IN CHIEF WILL SMITH RESPONDS: Glad you like the PDFs, Billy; a lot of our readers seem to enjoy them as well. Currently, our archives range from late 2005 to the present, and we plan to eventually post back issues for all the magazines we have produced PDFs for—all the way back to late 2001. Before then, it gets trickier, as we don't have access to the earlier fonts and layout programs we used to create the magazine.

BUDGET-FRIENDLY HEADPHONES?

I record a lot of music on my computer, and I don't work in a soundproof room. I need a pair of headphones that can block out background noise and be volume adjustable. Also, I need headphones that cost less than $100.

—David Eall

EXECUTIVE EDITOR MICHAEL BROWN RESPONDS: PCs and inexpensive digital recording gear rendered the home recording studio a reality long ago, so don't worry about having a soundproof room. You will need to be careful about isolating yourself from background noise when recording acoustic instruments, especially vocals, but that's about it.

As for headphones, I'm not sure why you need a volume adjustment on the headphones themselves—you should be able to control the output to your phones from your mixer (independently of the signal you're actually recording, of course). It's more important that you choose headphones with flat frequency response, meaning they don't accentuate or diminish any particular frequency.

There are two ways to isolate your ears from background noise: The most common way is to choose a set of headphones with a closed-back design (a circumaural type, meaning their earcups completely encircle your outer ear). The alternative is to pick up a set of earbuds that fit inside your ear canals. But if you're recording, you'll find that headphones are much easier to put on and take off (which you'll do constantly).

With a budget of $100, you should be able to find several very good headphone candidates designed for recording. I can't speak from personal experience, having not reviewed any of these, but Sennheiser's HD 25-SP II, Audio-Technica's ATH-D40fs, and AKG's K 141 have all earned solid reputations and have street prices at the top of your range. MPC

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COMING NEXT MONTH IN MAXIMUMPC'S CHOCK-FULL O' NUTRACEUTICALS MARCH ISSUE

WINDOWS TIPS FOR EVERYONE

Whether you're rocking Vista or XP, our comprehensive optimization guide is guaranteed to improve your OS experience.

OVERCLOCK YOUR VIDEOCARD

Push your graphics performance to new heights without spending a cent. We'll show you how.

GAME OF THE YEAR

PC gaming is far from dead. The last year has given us so many kick-ass titles that it's going to be tough to pick our favorite game moments. Tune in next month when we announce the top honors.

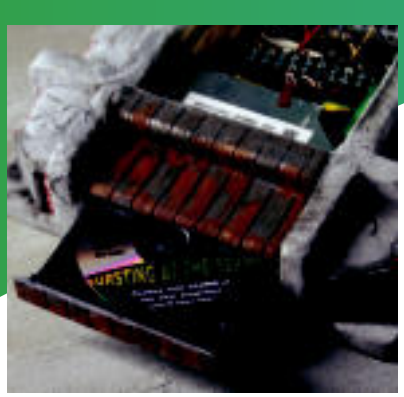
CHRIS BLARSKY'S

Max PC

Chris Blarsky was motivated to create the Max PC mod after reading one of Editor in Chief Will Smith's editorials. In July 2007, Smith wrote, "Desktop design is stagnant. Why must every PC be constructed of black plastic and chrome?"

Chris responded by attempting to show what he describes as "the raw essence of PC building in the design of a system." Well, nothing says power like a Dale Keown-era Hulk—and mounting the mobo al fresco, without a lick of protection, is an inspired design decision to be sure.

A week after completing the mod, the Hulk's hollow legs began to buckle. Luckily, some expanding-foam glue stabilized the structure.



Hulk smash! Chris explained that the mobo the Hulk is holding aloft had a previous life in a cash register at a smoky local college bar—even two trips through a dishwasher failed to destroy it.

For his winning entry, Chris wins a $500 gift certificate for eWiz.com to fund his modding madness! See all the hardware deals at www.eWiz.com, and turn to page 92 for contest rules.

MAXIMUM PC (ISSN 1522-4279) is published monthly by Future US, Inc, 4000 Shoreline Court, Suite 400, South San Francisco, CA 94080, USA. Periodicals postage paid in South San Francisco, CA, and at additional mailing offices. Newsstand distribution is handled by Time Warner. Basic subscription rates: one year (13 issues) US: $20; Canada: $26; Foreign: $42. Basic subscription rates "Deluxe" version (w/CD): one year (13 issues/13 CD-ROMs) U.S.: $30; Canada: $40; Foreign $56. US funds only. Canadian price includes postage and GST (GST#R128220688). Postmaster: Send changes of address to Maximum PC, P.O. Box 5159, Harlan, IA 51593-0659. Standard Mail enclosed in the following edition: None. Ride-Along enclosed in the following editions: B1, C1, C2, C3, C4. Int'l Pub Mail# 0781029. Canada Post Publications Mail Agreement #40043631. Returns: Bleuchip International, P.O. Box 25542 London, ON N6C 6B2. For customer service, write Maximum PC, P.O. Box 5159, Harlan, IA 51593-0659; Maximum PC, 4000 Shoreline Court, Suite 400, South San Francisco, CA 94080. Future Network USA also publishes PC Gamer, PSM, MacLife, and Official Xbox. Entire contents copyright 2007, Future Network USA. All rights reserved. Reproduction in whole or in part is prohibited. Future Network USA is not affiliated with the companies or products covered in Maximum PC. PRODUCED AND PRINTED IN THE UNITED STATES OF AMERICA.